TURBO SUPERTERM ®

CICP1800/CICP1400UL

CICP1800T/CICP1400ULT

Access Control Unit

Installation and Service Manual

Version P1800v1.2

CONTINENTAL INSTRUMENTS
ACCESS CONTROL & INTEGRATED SECURITY

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WI1267A 10/04

FCC Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

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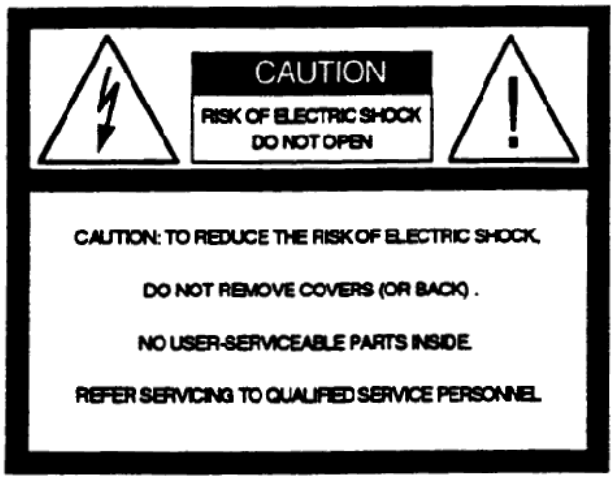
The installation of this product should be made by qualified service personnel and should conform to all local codes.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVERS (OR BACK) .
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

WARNING

This product generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this product in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

UNPACKING AND INSPECTION

Unpack carefully. This is an electronic product and should be handled as such. Compare the items received with the packing list with your order.

Be sure to save:

1. **The shipping cartons and insert pieces. They are the safest material in which to make future shipments of the product**
2. **The IMPORTANT SAFEGUARDS sheet**
3. **These Installation and Operating Instructions.**

WARNING

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

MAINTENANCE

User maintenance of this unit is limited to external cleaning and inspection. For specific recommendations refer to the IMPORTANT SAFEGUARDS sheet packaged with this product

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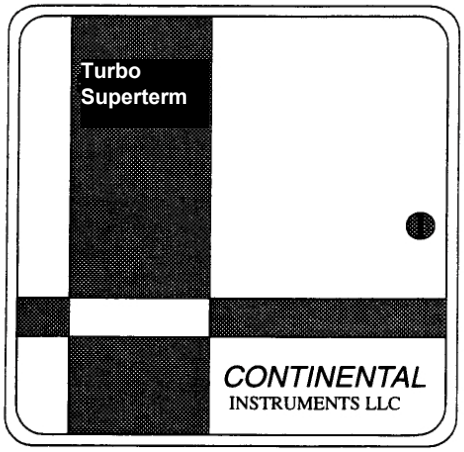


DESCRIPTION

The Turbo Superterm is a fully programmable, self contained, 8-door access control system that offers users flexibility, expandability, and simplicity. Operating as a standalone unit or within a network, each Turbo Superterm makes independent access control decisions.

The Turbo Superterm accepts Wiegand, Magnetic Stripe, Proximity card readers, and Keypads to control the access functions for a maximum of eight individual access points (entrances/exits). It supports a maximum of 24 alarm devices including door contact sensors, door bypass switches, or other related detection accessories. Seventeen onboard Form C relays support door locking mechanisms, door alarm shunts, request to-exit sensors, or handicapped access privileges.

The standard Turbo Superterm features a user-programmable, onboard database that supports a maximum of 40,000 card holders. Expansion components enable the Turbo Superterm to support up to a maximum 210,000 card holders with 4MB memory expansion.

Note: Card Capacities can vary due to changes in Firmware, Badge Length, and Panel Configuration (Transaction buffer size, Time Schedule Blocks, and Access Groups). Maximum Card Count can be verified by checking Communication Driver (Max Card Count Column).

The standard Turbo Superterm uses an onboard 7AmpHour (AH) backup battery to carry out full access control functions for a period of four hours in the event of an AC power supply loss. The expanded Turbo Superterm features an onboard 12AH backup battery to operate system devices for the same length of time (four hours).

In addition, an internal lithium battery protects the on-board database and programmed operating instructions from loss for a period of six months. In the event of a total failure of the AC power supply *and* the backup battery, the Turbo Superterm would immediately be ready for full operating capability once a source of operating power is re-established.

For enhanced site access control requirements, multiple Turbo Superterm units (a maximum of 63) may be networked together or with other Continental Instruments products including Smarterm, Miniterm, Microterm and Super Two. A Turbo Superterm network may be configured to operate in a repeater mode or in a multidrop mode, using the RS-422 communications protocols.

A single host computer may be used to manage and program one Turbo Superterm or a fully developed network of Turbo Superterms, saving equipment and installation costs, database entry/deletion procedures, and monitoring individual access usage.

Changes or upgrades to the Turbo Superterm operating software are readily downloadable from the host computer to either one specific Turbo Superterm or an entire network of Turbo Superterms, eliminating the risky practice of physically changing the ROM chips inside the unit(s).

4-Door Version

The Turbo Superterm is available as a 4-door version. The 4-door version shares the same cabinet and main circuit board as the 8-door version, but with fewer components.

The 4-door version of the Turbo Superterm supports four door connectors, nine relays, and 16 alarms. Installation procedures for the 4-door version are the same as the 8-door version.

REGULATORY CONSIDERATIONS

Regulatory Considerations for Turbo Superterm Installations

The Turbo Superterm has been designed to standards that were devised to assure safe and reliable performance. Verification that these objectives have been met was delegated to Underwriters Laboratory (UL), the most established, nationally recognized testing laboratory (NRTL).

Specification Explanations

The following section outlines some of the benefits associated with having the Turbo Superterm listed to the particular UL specification.

UL 294 - Safety of Access Control System Units

- The product survives high voltage power-line and signal line electrical transients.
- Endurance proven by verifying operation of individual access circuits for over 100,000 cycles at the maximum load rating.
- Affords some confidence that the installation will survive physical attack without allowing invalid access to an area.
- Effective backup power and recharge functions that assure four hours of operation with the supplied standby batteries.

Installer Responsibilities (General)

For the Turbo Superterm to meet the users expectations under any of the previously mentioned UL specifications, the installer has several definite responsibilities, including:

All wiring must conform to all National Electric Code (NEC) specifications, where designated.

All wiring must conform to National Fire Protection Association (NFPA) schedule 70 specifications, where designated.
All wiring must conform to any and all local building electrical codes.
Furthermore,
The transient protection circuits built into the unit will protect the Turbo Superterm and most of the connected equipment *only* when the chassis of the Turbo Superterm unit is effectively grounded.

The ratings and limitations declared on the Turbo Superterm UL label must not be exceeded.

No more than one DI/DO (relay expansion) board may be installed in the standard Turbo Superterm version because an excess current load may be drawn from the on-board power supply when all of the relays are activated.
A maximum of three DI/DO boards may be installed in the expanded version of the Turbo Superterm when the optional 12V power supply is installed, or, eight 200mA proximity readers may receive power from the door connectors.

Installer Responsibilities (UL Specific)

UL294 General

In UL294 installations, one DI/DO board may be installed in the standard Turbo Superterm unit. Two DI/DO boards may be installed in the expanded version when the optional 12V power supply and the optional 12AH battery are used.

UL 294 requires that the product be able to operate under back-up power for four hours under the worst-case situation. This condition will be met with continuous activation of all accessory relays when one DI/DO board is installed in the standard Turbo Superterm, and when two DI/DO boards are installed in the expanded Turbo Superterm version.

UL294 Specific

Under UL294 specifications, only card readers specifically listed in the UL file, or, which themselves carry the UL294 label, may be used.

There are no special restrictions on which model Host Computer is used or which version of software is installed.

CONFIGURATION

Standard Version

Capacities
The standard version Turbo Superterm provides access control functions for up to eight doors and eight card readers. Each 5V reader may draw as much as 100mA from the 5V pin of the reader connector, for a total current draw of 800mA per panel. Eight 12V readers may draw up to a total per panel of 500mA from the 12V pin of the reader connector.

The standard version may also provide 500mA at 12V for one DI/DO (relay expansion) board or other 12V powered accessories. The DI/DO board adds 16 relay outputs to the eight accessory relay outputs provided on the main board. All 12V accessories receive power from the backup battery when the equipment is operating during a power failure.

Each of the 24 alarm inputs on the main board may be configured as supervised alarms (requiring termination resistors), or standard alarms (requiring plain electrical contacts). Each Supervised Alarm Board added to the Turbo Superterm increases the number of supervised alarm inputs by 16. Three Supervised Alarm Boards may be added to the standard Turbo Superterm unit.

NOTE: Adding more than 1 expansion board prevents the use of software virtual inputs.

Expanded Version

When additional 12V accessory power is required at a particular site, the unit may be ordered with an expansion power supply that allows the unit to retain all regulatory listings. This unit will conservatively power eight 12VDC proximity readers rated at 200mA each, or any combination of Supervised Alarm Boards and DI/DO (Relay Expansion) Boards.

The expansion power option is bundled with a larger backup battery allowing the unit to meet the standby power requirements of UL294 when two DI/DO boards are installed with all relays activated at a 100% duty cycle.

Memory Configurations

The standard 512K memory configuration provides resources for downloadable firmware as well as for the cardholder database and a transaction buffer. Two 2MB memory expansion boards (2X2MB) are available for expansion of card database and transaction buffer space. The 2MB expansion boards allow the Turbo Superterm to meet the requirements of managing large cardholder populations.

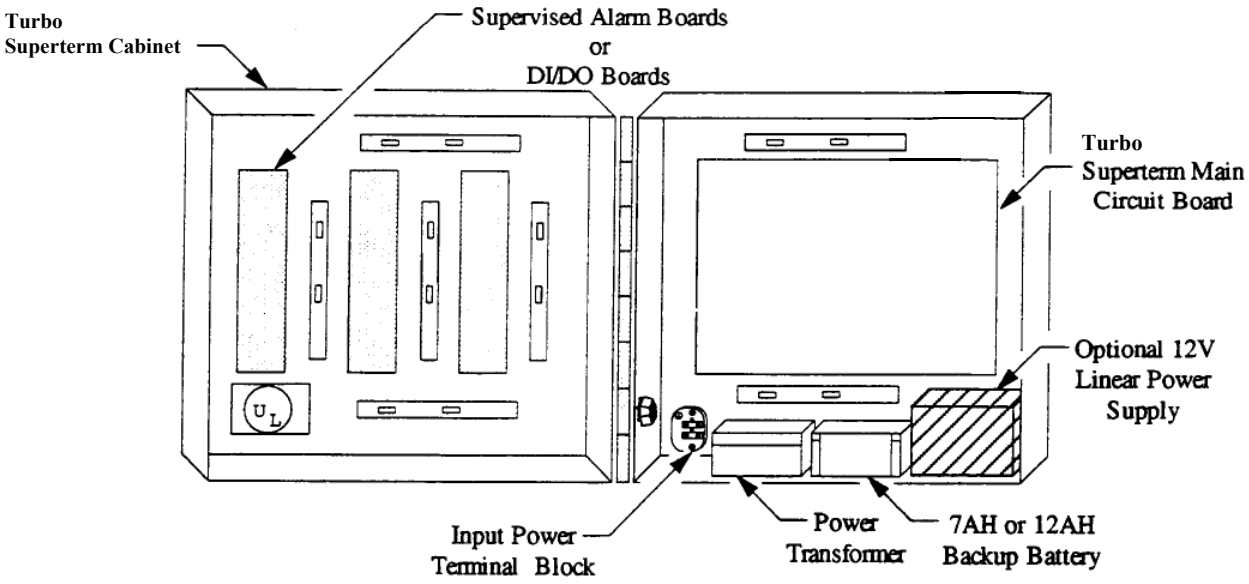


Figure 2 - Turbo Superterm Components

Expansion Boards and Accessories

Memory Expansion

- **Standard Memory**: The standard UL version uses a static 512K x 8 RAM (U61) to support downloadable code, to provide working RAM, and to support the card database.
- **2-4 MB Expansion**: Two optional 2MB of RAM memory expansion boards (2X2MB) may be added to the Turbo Superterm, providing support for a maximum 210,000 card holders.

NOTE: The Standard RAM (512K x 8) should ONLY be removed when BOTH 2X2MB expansion boards are installed. See memory upgrade information beginning on page 82.

Digital Input/Digital Output (DI/DO) Board

The DI/DO Board supports up to eight, non-supervised inputs and provides 16 relay outputs to devices controlled by two-state signals (see Figure 2).

Supervised Alarm Board

The Supervised Alarm Board supports 16 supervised alarms, with each alarm having five states (normal, abnormal, open, short, and ground fault).

Battery Backup

During power interruptions, the Turbo Superterm continues operating for a maximum of 4 hours via an on-board 7 AmpHour back-up battery (standard version) or a 12 AmpHour back-up battery (expanded version).

The backup battery provides DC power for all Turbo Superterm access control and alarm monitoring functions. After charging for 48-hours, the battery carries the rated load for four or more hours. A low-voltage battery sensing circuit protects the Turbo Superterm by disconnecting the battery from the main circuit if the battery discharges too much current.

To provide adequate power for a minimum of four hours, the standard Turbo Superterm 7 AmpHour battery allows the installation of only one DI/DO board.

The expanded Turbo Superterm version includes a 12AH backup battery to provide adequate power for two DI/DO boards for a minimum of four hours.

Power Transformer

The step-down transformer provides 14VAC to the on-board linear power supply. An AC power terminal block and grounding screw provide connection points for the three incoming 120VAC service lines.

Optional Turbo Superterm versions are available that will support 220VAC power where required for use outside of the United States.

INSTALLATION

Only qualified service personnel familiar with all local building codes should attempt this installation. Take appropriate safeguards to avoid unintentional operation by employees and maintenance personnel working about the premises.

The installation of each Turbo Superterm system should be completed and tested on its own before connecting into a network. Any possible wiring or installation problems are magnified many times by the complexity of the network.

Once an individual panel has been tested and found operating satisfactorily, it can then be safely brought into the network.

The following warnings are designed for the safety of the Turbo Superterm install/service technician and for the continued proper function of the Turbo Superterm unit.

About This Manual

This manual describes the installation of the Turbo Superterm Access Control Unit and the specific accessories that connect to it.

NOTES:	Notes are included with a procedure informing the technician about related material.
CAUTION	Cautions indicate that a particular process requires special attention.
WARNING	Warnings indicate that a particular process exposes the technician to live circuits or that making wrong connections can lead to equipment failure.
CAUTION	Do not place accessory circuit cables in the same conduit sections containing power cables.

CAUTION	Prevent the risk of a fire by replacing ALL fuses with the same type and rating (see page 88, Backup Battery Inline Fuse Replacement). The main fuse protects the linear power supply circuit against excessive currents and short circuits. Failure of the linear power supply (other than a blown fuse) fuse usually indicates a fault in a power supply component. There are no user-servicable parts in the Turbo Superterm cabinet. The power supply must be replaced if it fails.
WARNING	The linear power supply has exposed terminals (see page 11). DO NOT probe the Turbo Superterm cabinet and expose yourself to high voltage and a shock hazard.
WARNING	The risk of a serious electrical shock exists if the wiring harness power connector is removed from the Turbo Superterm circuit board, but AC power remains live at the AC Input Terminal Block (see Figure, page 11).
WARNING	Prevent shock during servicing when the POWER ON lamp is disconnected. To determine if power is present, check the status of the Turbo Superterm's top LED (see page 80, LED Diagnostics). The top LED will be illuminated if power is present.

Installation Preparation

First, select a mounting location within a secure, limited access area (see Figure 3). Ensure that an "earth ground" connection is available near the Turbo Superterm installation site. Note the type of wall construction that the enclosure will be secured to.

- Determine that adequate space is available for mounting the Turbo Superterm cabinet on a wall with no interference from wires, pipes, or other obstructions.

- Proper installation of the Turbo Superterm cabinet requires an area of free space measuring:

21.5 inches high (546mm)
X
21.25 inches wide (540mm)
X
7.0 inches deep (178mm)

- Confirm that adequate free space exists on both sides of the Turbo Superterm cabinet for cabling conduit entering and exiting the cabinet.

- Determine the directions of the cabling conduit exiting the Turbo Superterm cabinet. Confirm sufficient access to ceilings and/or walls before fitting the conduit lengths.

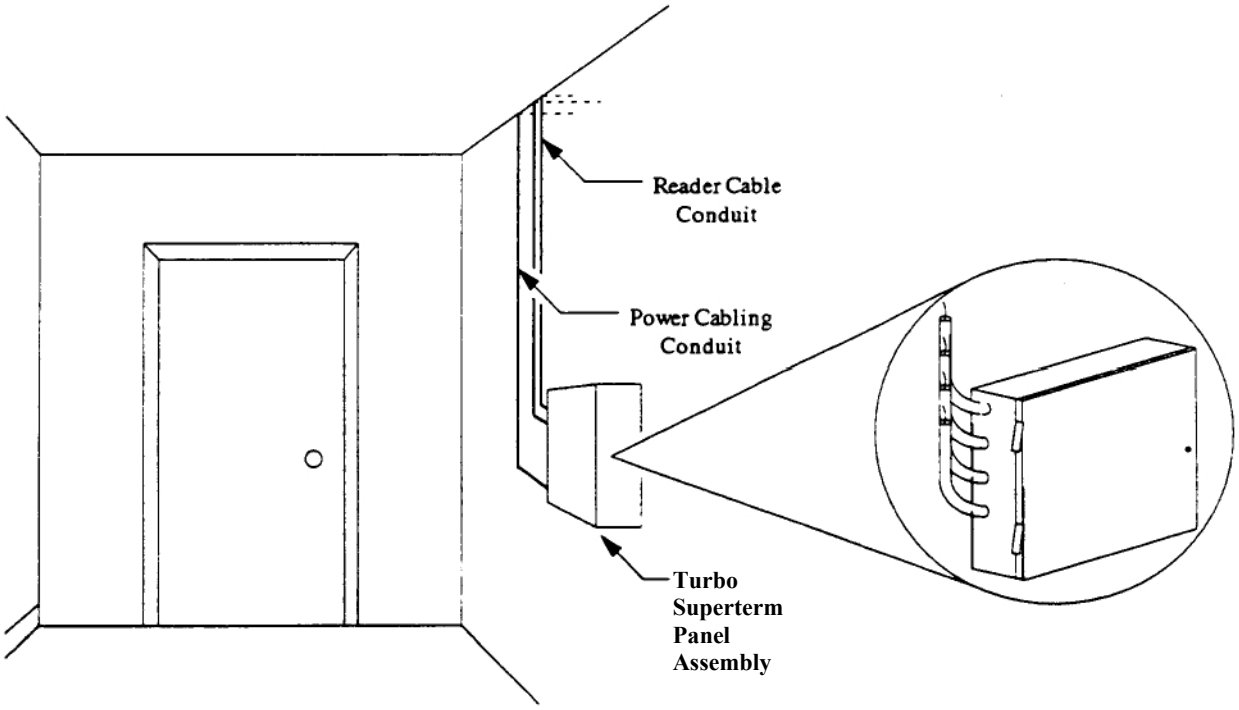


Figure 3 - Turbo Superterm Installation Location

Cabinet Mounting

Inspect the mounting surface around the proposed installation site. The mounting surface must be capable of supporting 55 pounds (25Kg) plus any additional weight of the installation hardware.

CAUTION
Use only suitable mounting hardware for the type of wall construction encountered.

1. Determine the Turbo Superterm cabinet mounting location.

2. Mark the four mounting holes against the mounting surface using the Turbo Superterm cabinet as a template or using the measurements provided in Figure 4.

NOTE: Mark the small oval portion of the cabinet screw holes (see Figure 5, Detail A).

3. Place the Turbo Superterm cabinet out of the way.

4. Drill pilot holes to the required depth and size for the mounting screws.

5. Insert the mounting screws into the wall. Leave approximately one quarter of the screw's length protruding from the wall.

NOTE: Do not tighten screws completely at this time.

6. Place the Turbo Superterm cabinet over the mounting screws.

Secure the Turbo Superterm cabinet to the mounting surface and tighten the remaining length of the screws.

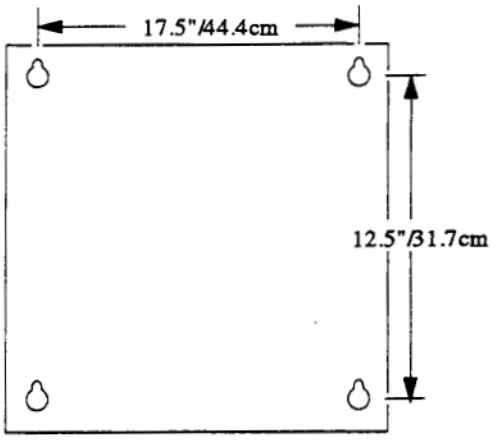


Figure 4 - Turbo Superterm Cabinet Mounting Hole Dimensions

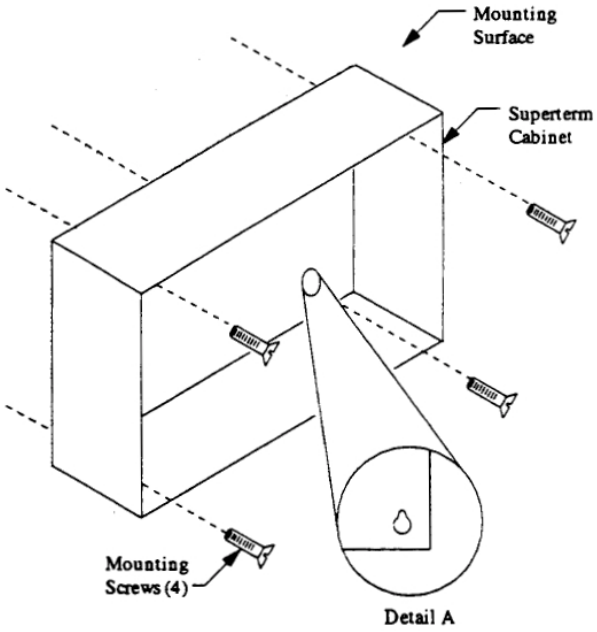


Figure 5 - Turbo Superterm Mounting Screws

Cable Routing

All associated cabling for the Turbo Superterm is divided into two categories:

- **Power Cables and Accessory Relay Devices**
  This category contains all the power cables servicing the Turbo Superterm and any accessory relay controlled devices connected to it.

- **Communication Cables**
  This category contains all the communication cabling between the Turbo Superterm and all communication devices, all alarm devices, and all card reader devices.

NOTE: For proper operation of the Turbo Superterm, route EACH category of cabling in SEPARATE conduit (i.e., **DO NOT mix alarm and communication cables in the same conduit as relay and power cables**).

Incoming Power Conduit Knockout

The Turbo Superterm System requires 120VAC, 60 Hz voltage to the AC Input Power Terminal Block (see page 16). The power cabling is delivered to the Turbo Superterm through a knockout located on the lower center of the left side cabinet wall (see Figure 6). The knockout accepts EIA standard 1-inch or 3/4 inch conduit connectors.

NOTE: All wiring must conform to National Electric Code (NEC), NFPA 70, as well as any local building codes.

Accessory Conduit Knockouts

All cabling for the Turbo Superterm is routed through EIA standard two-size knockouts located on the left and right sides of the cabinet (see Figure 6). The outer knockout size accepts EIA standard 1-inch conduit connectors and the inner knockout accepts EIA standard 3/4-inch conduit connectors.

Grounding Accessory Drain and Shield Wires

Ensure electromagnetic compatibility and reliable performance by keeping all accessory drain and shield wires as short as possible.

All accessory drain and shield wires (except RS-232) connect to ground posts mounted along the knockout strips on both sides of the Turbo Superterm cabinet (see Figure 6).

The following procedures assure proper installation of all drain and shield wires.

- Carefully remove the cable jacket after the cable enters the Turbo Superterm cabinet.
- Place the drain and shield wires under the ground post screw.
- Verify a good connection and tighten the ground post screw.
- Connect the accessory wires to the appropriate terminal strip on the Turbo Superterm circuit board.

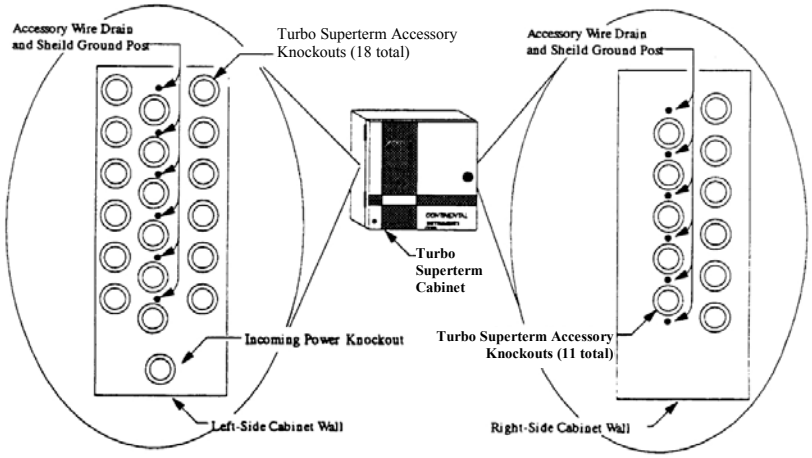

Accessory Wire Drain and Sheild Ground Post
Turbo Superterm Accessory Knockouts (18 total)
Accessory Wire Drain and Sheild Ground Post
Turbo Superterm Cabinet
Incoming Power Knockout
Turbo Superterm Accessory Knockouts (11 total)
Left-Side Cabinet Wall
Right-Side Cabinet Wall

Figure 6 - Cabling Conduit Knockouts

POWER CONNECTIONS

AC Power Source Grounding

The Turbo Superterm main circuit board has built-in surge suppression devices. The surge suppressors require a good earth ground connection to operate effectively.

Check the DC resistance between the 120VAC power ground terminal and a known earth ground such as a metal water pipe or structural steel building component

CAUTION
DC resistance between the 120VAC power ground terminal and a known earth ground must be no greater than 50 ohms.

If the DC resistance is acceptable, install the 120VAC power cabling using the ground terminal as the earth ground.

120VAC Power (220 VAC Optional)

The Turbo Superterm system requires 120VAC, 60 Hz voltage. The incoming 120VAC source voltage connects to the AC Input Power Terminal Block located in the lower left-hand corner of the Turbo Superterm cabinet (see Figure 7).

NOTE: Use of a dedicated, unswitched 120VAC power source results in optimal performance with minimum interference. Turbo Superterm units with optional **220VAC** power are available where required for use outside of the United States.

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with connections.

Table 1 lists the incoming 120VAC source voltage connections to the AC Input Power Terminal Block.

Table 1- AC Input Power Terminal Block Connections		
Incoming 120VAC	Wire Color	AC Input Terminal Block
Line	Black	L
Neutral	White	N
Ground	Green	⏚

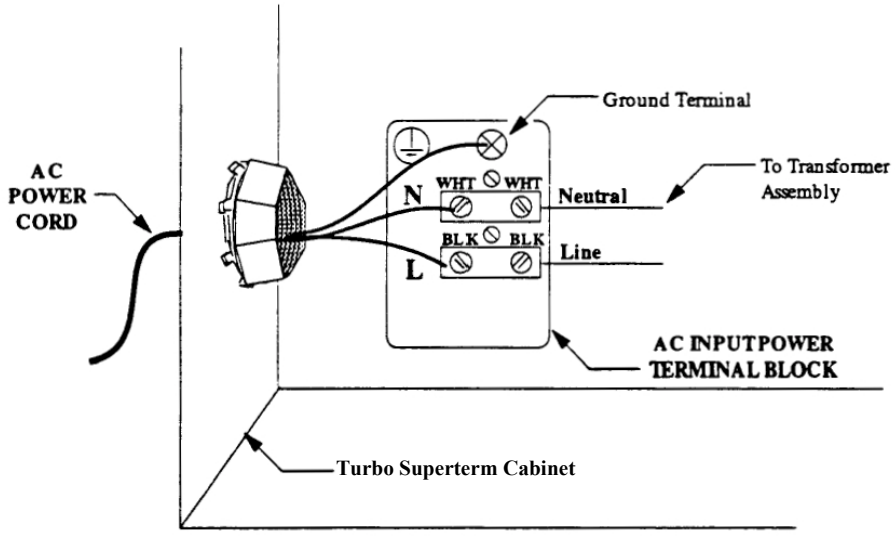


Figure 7 - AC Input Power Terminal Block

Turbo Superterm Circuit Board Layout

The Turbo Superterm circuit board (see Figure 8) provides wiring terminal strips for external access control devices (card readers, keypads, alarms, etc.).

The following descriptions in this manual reference the Turbo Superterm main circuit board, shown below, and use cutaway drawings to identify specific locations on the circuit board.

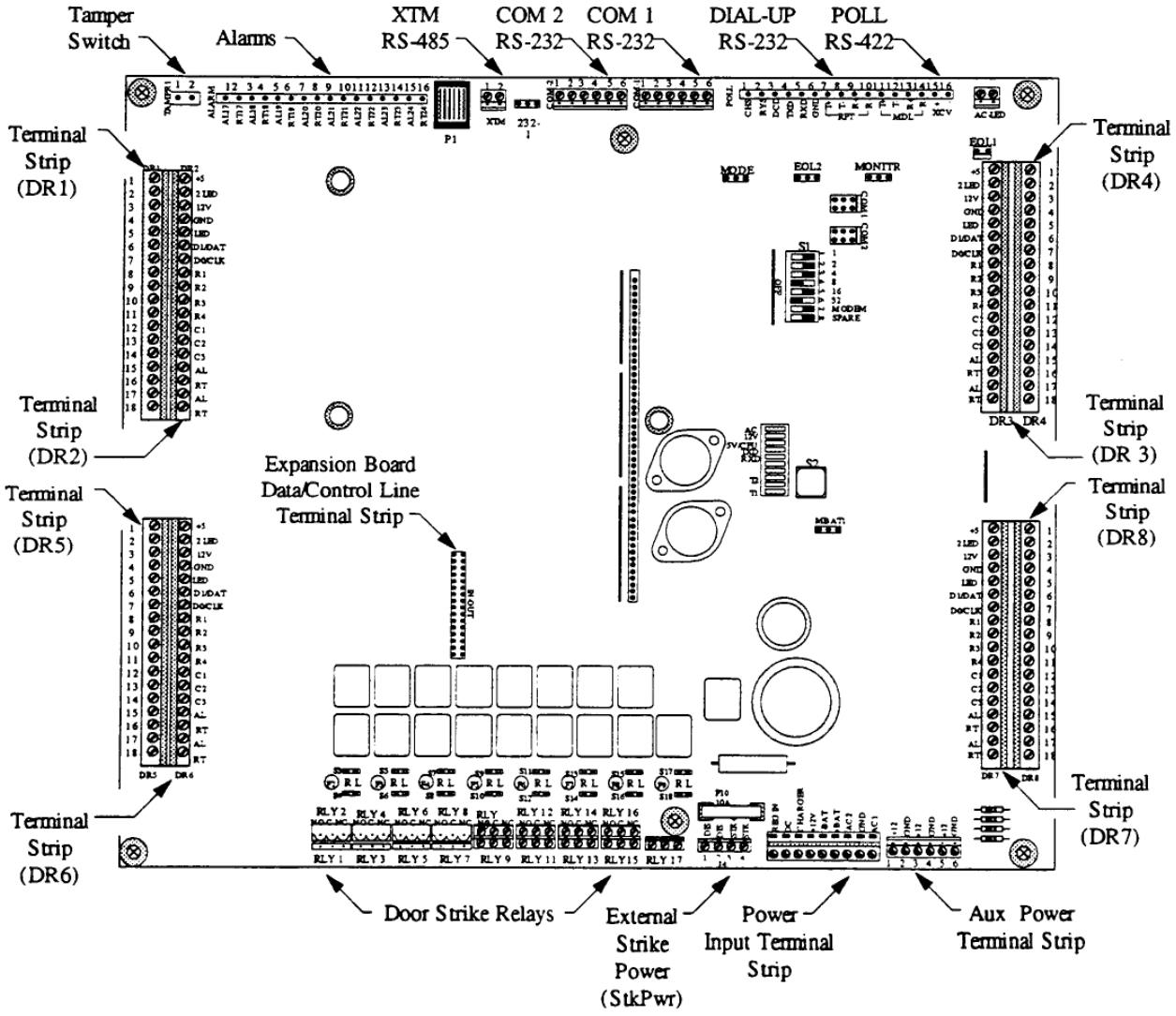


Figure 8 - Turbo Superterm Circuit Board Layout

Step-Down Transformer Connection

The Turbo Superterm circuit board is powered from an internal power supply driven by a separate step-down transformer. The step-down transformer is mounted on the bottom ledge of the Turbo Superterm cabinet (see Figure 2, page 11, Turbo Superterm Components).

The Step-Down transformer connects to the Turbo Superterm circuit board through the Power Input terminal strip (see Figure 8, page 17, Turbo Superterm Circuit Board Layout).

Table 2 lists the connections between the Step-Down Transformer and the Turbo Superterm Power Input terminal strip. Refer to Figure 9, page 19, while reading Table 2 for Step-Down Transformer to Turbo Superterm Circuit Board connections.

NOTES: If the Turbo Superterm is NOT using the optional Expansion Power Supply, leave the female Molex connector from the transformer unconnected.
If the Turbo Superterm is equipped with an Expansion Power Supply, connect the female Molex connector from the Expansion Power Supply to the male Molex connector of the Transformer Assembly (see Figure 9).

Power Input Terminal Strip Jumpers

Pins 1, 2, and 3 of the standard Turbo Superterm (with no Expansion Power Supply) must be jumped together. Table 3 lists the pin connections on the Power Input terminal strip that require jumpers. Refer to Figure 9, page 19 while reading Table 3 for Power Input terminal strip jumper connection.

NOTE: If using an Expansion Power Supply, pin 1 must be open, and pins 2 and 3 must be jumpered together. Refer to CAUTION on page 19.

Battery Backup Connection

During power interruptions, the Turbo Superterm continues operating for a maximum of 4 hours via an on-board 7A-hour back-up battery (standard version) or a 12A-hour back-up battery (expanded version).

Table 4 lists the connections from the Battery Backup to the Turbo Superterm Power Input terminal strip. Refer to Figure 9, page 19, while reading Table 3 for Battery Backup to Turbo Superterm Circuit Board connections.

WARNING
Do NOT connect the Backup Battery or provide AC source voltage to the Turbo Superterm until all accessory cabling is completed.

Table 2 - Connection Table for Step-Down Transformer

Power Input Terminal Strip		Transformer Assembly	
Pin #	**Function**	**Wire Color**	**Function**
1	REG IN		
2	DC		
3	CHARGER		
4	+12V		
5	-BAT		
6	+BAT		
7	AC2	Black	AC Power
8	GND	Yellow	GND
9	AC1	White	AC Power

Table 3 - Connection Table for Terminal Strip

Power Input Terminal Strip		Backup Battery
Pin #	Function	Jumper
1	REG IN	Jump to Pin 2 (DC)
2	DC	Jump to Pin 1 (REG IN) &3 (CHARGER)
3	CHARGER	Jump to Pin 2 (DC)
4	+12V	
5	-BAT	
6	+BAT	
7	AC2	
8	GND	
9	AC1	

Table 4 - Connection Table for Backup Battery

Power Input Terminal Strip		Backup Battery
Pin #	Function	Function
1	REG IN	
2	DC	
3	CHARGER	
4	+12V	
5	-BAT	Neg (-) post
6	+BAT	
7	AC2	Pos (+) post
8	GND	
9	AC1	

Expansion Power Supply Connection

The Turbo Superterm circuit board provides +12V power for accessories via an expansion power supply.

Table 5 lists the connections from the Expansion Power Supply to the Power Input terminal strip (see Figure 9).

NOTE: Connect the female Molex connector from the Expansion Power Supply to the male Molex connector of the Transformer Assembly (see Figure 9).

CAUTION
Using the Expansion Power Supply requires placing a jumper between pins 2 and 3 of the Power Input terminal strip (see Figure 9 and Table 5).

NOTE: Pin 1 must remain OPEN.

Table 5 - Connection Table for Expansion Power Supply

Power Input Terminal Strip		Expansion Power Supply	
Pin #	Function	Wire Color	Function
1	REG IN		
2	DC	Jumper to pin 3 (CHARGER)	
3	CHARGER	Jumper to pin 2 (DC)	
4	+12V	Red	Pos (+) post
5	-BAT	Black	Neg (-) post
6	+BAT		
7	AC2		
8	GND		
9	AC1		

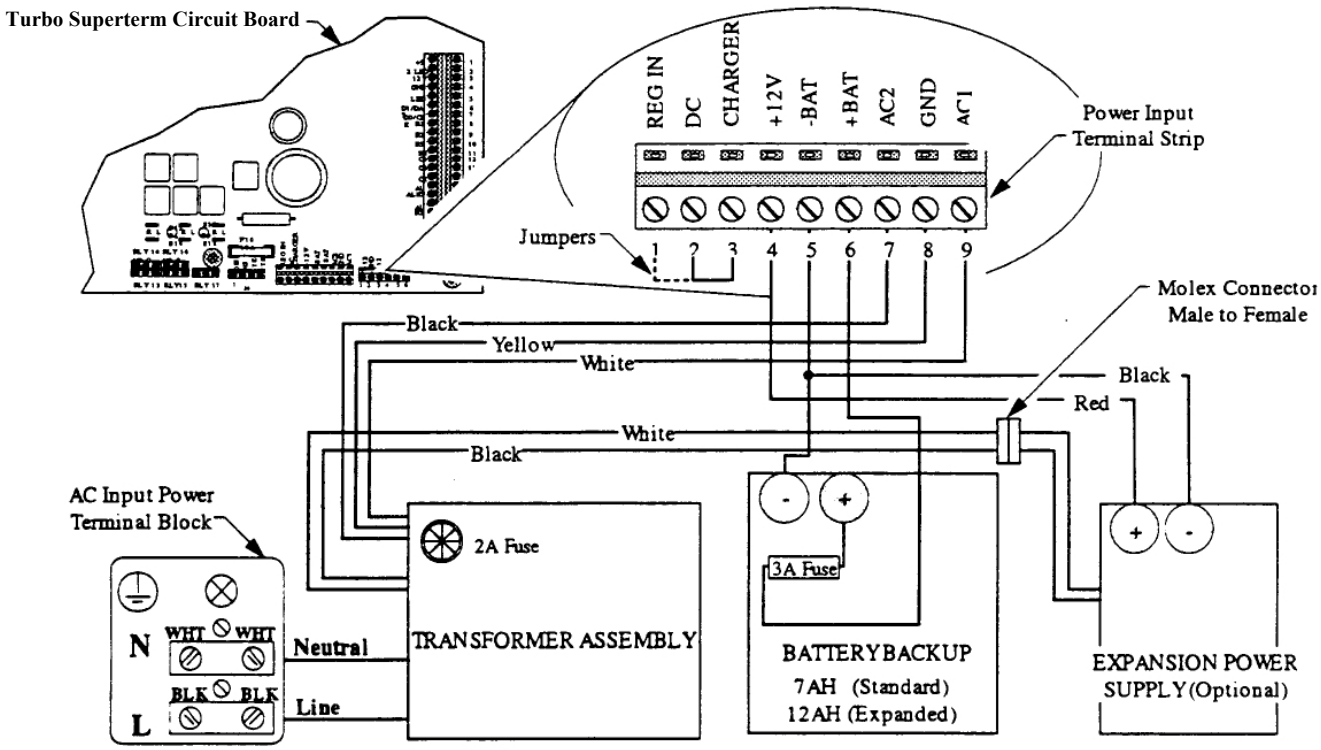


Figure 9 - Connecting Transformer, Battery, and Power Supply to Turbo Superterm Circuit Board

DOOR CONNECTIONS

Inputs from Card Readers, Keypads, and Door Alarms connect to the Turbo Superterm via eight terminal strips (labeled DR1, DR2, DR3, DR4, DR5, DR6, DR7, and DR8).

NOTE: The terminal strips are grouped in pairs on one connector block.

- Terminal strips DR1 and DR2 are paired together on the same connector block located in the upper left-hand comer of the Turbo Superterm Circuit Board (see page 17, Turbo Superterm Circuit Board Layout).
- Terminal strips DR3 and DR4 are paired together on the same connector block located on the lower left-hand comer of the Turbo Superterm Circuit Board.
- Terminal strips DR5 and DR6 are paired together on the same connector block in the upper right-hand corner of the Turbo Superterm Circuit Board.
- Terminal strips DR7 and DR8 are paired together on the same connector block located on the lower right-hand side of the Turbo Superterm Circuit Board.

Wiegand/Proximity Reader Connections

Wiegand/Proximity Readers connect to terminal strips DR1 through DR8 (see Figure 10). Terminal strips DR1 through DR8 follow the same connection procedures.

Table 6 lists the connections between the DR1 through DR8 terminal strips and the Wiegand/Proximity Readers.

Table 6 - Connection Table for Wiegand /Proximity Reader

DRx Terminal Strip Pin #	Function	Wire Color
1	+5VDC	Red*
3	+12VDC	Red*
4	Ground	Black
5	LED	Brown
6	Data-1/DAT	White
7	Data-0/CLK	Green

* Proximity Reader may be powered by either +5VDC or +12VDC.

Wiegand/Proximity Reader Cable Requirements

Wiegand/Proximity Readers require a 5-conductor cable between the Turbo Superterm and the particular unit (see Figure 10).

NOTE: DO NOT use twisted pair cables.

Readers may have a combined maximum current draw of 500mA (+12VDC) or 800mA (+5VDC) per Turbo Superterm Circuit Board.

EXAMPLE: If eight identical +5VDC Readers are connected to one Turbo Superterm, each Reader could draw a maximum of 100mA.

Table 7 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and a Wiegand/Proximity Reader.

Table 7 - Cable Requirements for Wiegard/Proximity Readers

Unit	Distance (maximum)	Wire Gauge
Wiegand Reader	500ft/153m	22AWG Shielded w/ drain
Proximity Reader	500ft/153m	18AWG Shielded w/ drain

CAUTION
Keep all drain and cable shield wires between the Turbo Superterm and any Wiegand/Proximity Readers short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

Note: Please refer to reader manufacturer for specific instructions and specifications.

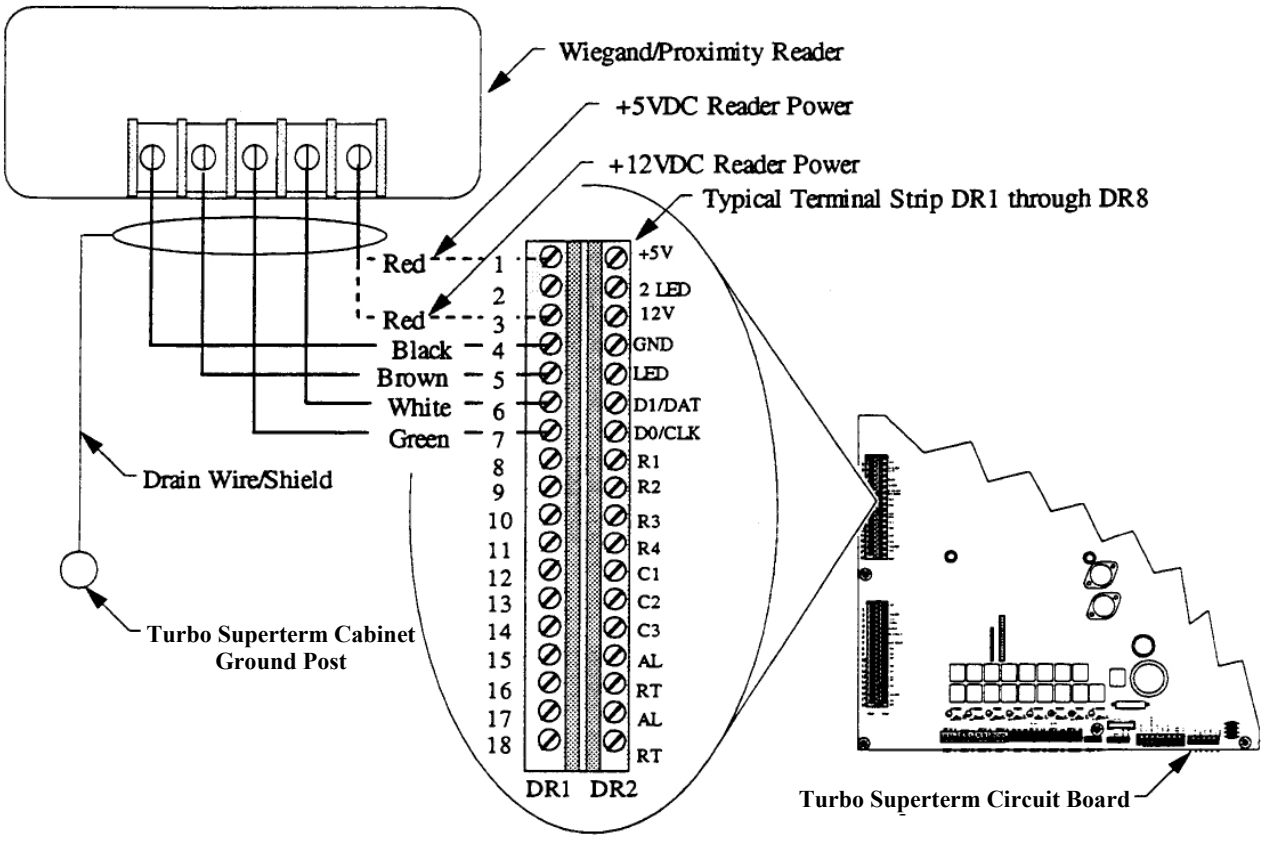


Figure 10 - Wiegand/Proximity Reader Connection to Turbo Superterm Board

Magnetic Stripe Reader Connection

Magnetic Stripe Readers connect to terminal strips DR1 through DR8 (see Figure 11). Terminal strips DR1 through DR8 follow the same connection procedures.

Table 8 lists the connections between the DR1 through DR8 terminal strips and the Magnetic Stripe Reader.

Table 8 - Connection Table for Magnetic Stripe Reader	
DRx Terminal Strip Pin #	**Function**
1	+5VDC
4	Ground
5	LED
6	Data-1/DAT
7	Data-0/CLK

Magnetic Stripe Reader Cable Requirements

Magnetic Stripe Readers require a 5-conductor cable between the Turbo Superterm and the particular unit (see Figure 11).

NOTE: DO NOT use twisted pair cables.

If the Magnetic Stripe Reader does not feature an LED indicator, substitute with a 4-conductor cable.

Table 9 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and Magnetic Stripe Readers.

Table 9 - Cable Requirements for Magnetic Stripe Reader		
Unit	**Distance**	**Wire Gauge**
Magnetic Stripe Reader	(maximum) 500ft/153m	22AWG Shielded w/drain

CAUTION
Keep all drain and cable shield wires between the Turbo Superterm and Magnetic Stripe Readers short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

Note: Please refer to reader manufacturer for specific instructions and specifications.

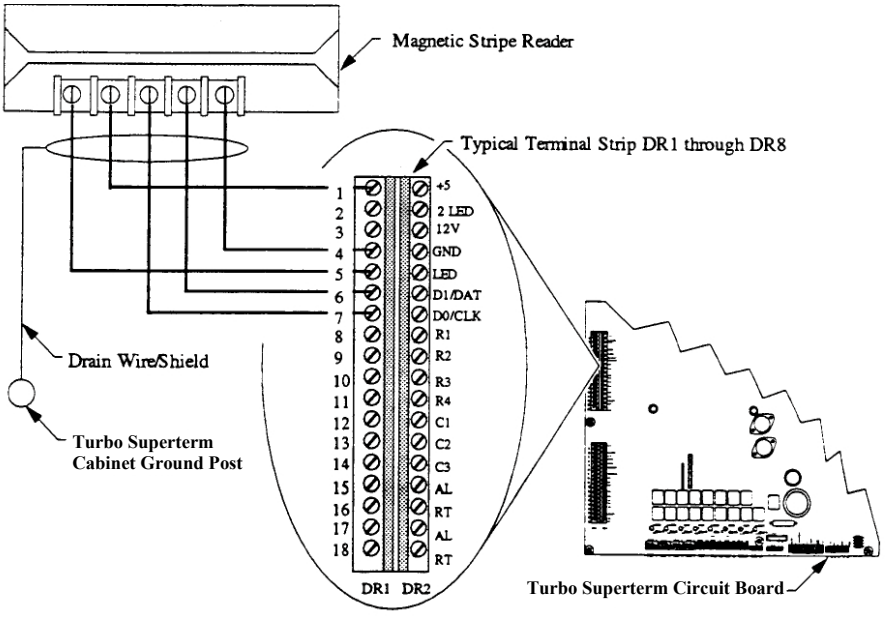


Figure 11 - Magnetic Stripe Reader Connection to Turbo Superterm Board

Keypad Connection

Twelve-position Keypads connect to terminal strips DR 1 through DR8 (see Figure 12). Terminal strips DR1 through DR8 follow the same connection procedures.

Table 10 lists the connections between the DR 1 through DR8 terminal strips and the Keypad.

Table 10 - Connection Table for Keypad Reader		
DRx Terminal Strip Pin #	**Function**	**Wire Color**
8	Row 1	Brown
9	Row 2	Red
10	Row 3	Orange
11	Row 4	Yellow
12	Column 1	Green
13	Column 2	Blue
14	Column 3	Violet

Keypad Cable Requirements

Keypads require a 22AWG, 7-conductor, stranded, shielded, cable with drain wire between the Turbo Superterm and the particular unit (see Figure 12).

NOTE: DO NOT use twisted pair cables.

Table 11 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the Keypad.

Table 11- Cable Requirements for Keypads		
Unit	**Distance (maximum)**	**Wire Gauge**
Keypad	500ft/153m	22AWG Shielded w/ drain

CAUTION

Keep all drain and cable shield wires between the Turbo Superterm and Keypads short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

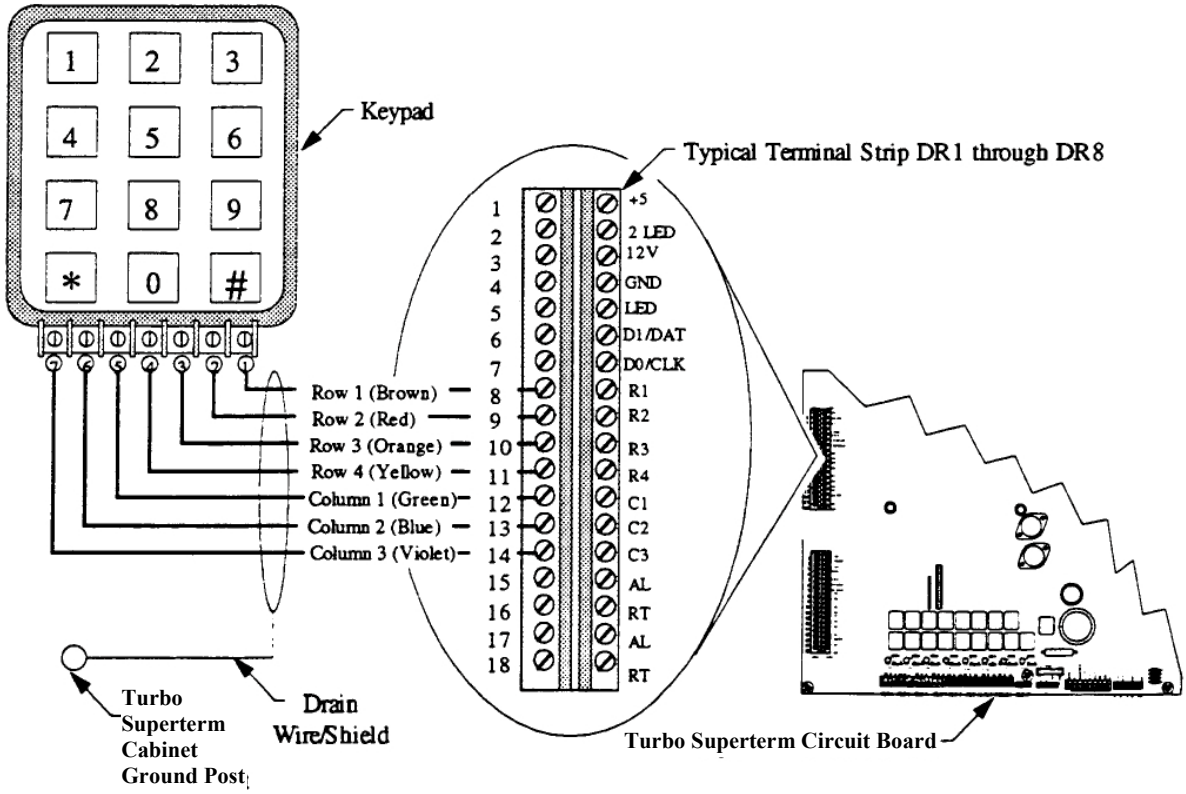


Figure 12 - Keypad Connection to Turbo Superterm Board

Door Status Sensor Connection

Door Status sensors connect to the Turbo Superterm through eight terminal strips labeled DR 1 through DR8 (see Figure 13).

Table 12 lists the connections between the DR1 through DR8 terminal strips and the Door Status sensor.

Table 12 - Connection Table for Door Status Sensor		
DRx Terminal Strip	**Signal**	**Door Status**
Pin #		Sensor Function
15	Alarm	Positive
16	Return	Negative

NOTES: Refer to page 38, Alarm Connection, to configure Door Status sensors as supervised alarms.
Door Status sensor connections to the Turbo Superterm are not sensitive to polarity.

Door Status Sensor Cable Requirements

Door Status sensors require a 22AWG, 2-conductor, stranded, shielded, cable with drain wire between the Turbo Superterm and the particular unit (see Figure 13).

NOTE: DO NOT use twisted pair cables.

Table 13 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the Door Status sensor.

Table 13 - Cable Requirements for Door Status Sensor		
Unit	**Distance**	**Wire Gauge**
Door Status Sensor	500ft/153m	22AWG Shielded w/ drain

CAUTION
Keep all drain and cable shield wires between the Turbo Superterm and Keypads short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

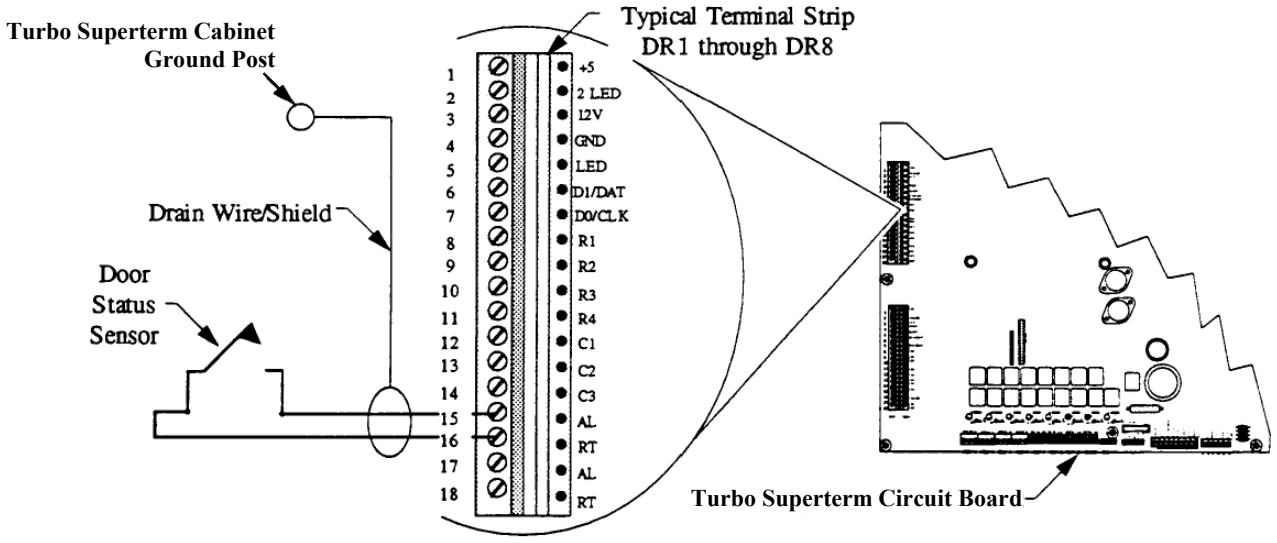


Figure 13 - Door Status Sensor to Turbo Superterm Connections

Request-to-Exit (Bypass) Sensor Connection

Request-to-Exit sensors (also known as Bypass sensors) work in conjunction with Door Status Sensors to provide complete facility entry and exit control. The Request-to-Exit sensor input connects to the same Turbo Superterm terminal strip (DR1 through DR8) that the associated Door Status Sensor connects to (see Figure 14).

Table 14 lists the connections between the DR1 through DR8 terminal strips and the associated Request-to-Exit sensor.

Table 14 - Connection Table for Request-to-Exit Sensor		
DRx Terminal Strip Pin #	Signal	Request-to-Exit Sensor Function
17	Alarm	Positive
18	Return	Negative

NOTE: Request-to-Exit sensor connections to the Turbo Superterm are not sensitive to polarity.

Request-to-Exit Sensor Cable Requirements

Request-to-Exit sensors require a 22AWG, 2-conductor, stranded, shielded, cable with drain wire between the Turbo Superterm and the particular unit (see Figure 14).

NOTE: DO NOT use twisted pair cables.

Table 15 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the Request-to-Exit sensor.

Table 15 - Cable Requirements for Request-to-Exit Sensor		
Unit	Distance	Wire Gauge
Request-to-Exit Sensor	(maximum) 500ft/153m	22AWG Shielded w/ drain

CAUTION

Keep all drain and cable shield wires between the Turbo Superterm and Keypads short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

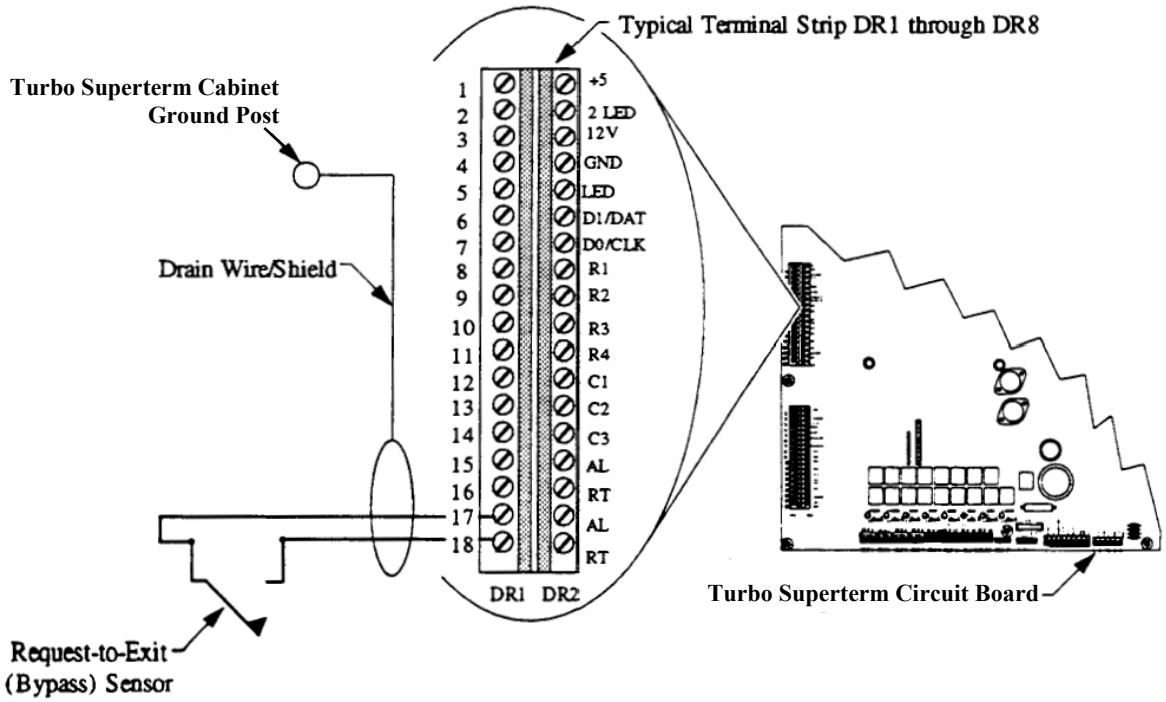


Figure 14 - Request-to-Exit Sensor to Turbo Superterm Connection

RELAY CONNECTIONS

Description

The Turbo Superterm provides 17 Form C relays to control door strikes, door alarm shunts, alarms, cameras, etc.

The relays are divided into three categories:

- **Door Strike Relays**
- **Auxiliary Relays**
- **Console Relay**

Door Strike Relays

Eight relays are designated as door strike relays and work in conjunction with card readers and keypads to control access at particular door sites.

The door strike relays are the first bank of relay terminal strips labeled, from left to right, RLY 1, RLY 3, RLY 5, RLY 7, RLY 9, RLY 11, RLY 13, and RLY 15, located on the bottom of the Turbo Superterm Circuit Board (see Figure 15).

Auxiliary Relays

Eight relays are designated as auxiliary relays and may be used for access control functions such as door alarm shunts.
The auxiliary relays are the second bank of relay terminal strips labeled, from left to right, RLY 2, RLY 4, RLY 6, RLY 8, RLY 10, RLY 12, RLY 14, and RLY 16, located on the Turbo Superterm Circuit Board (see Figure 15).

Console Relay

The Console Relay may be linked to specific events such as invalid door access, alarm input, and tamper switch input. The console relay is linked to an event through software.
The console relay is labeled RLY 17 and is located on the far right hand side of the first bank of relay terminal strips of the Turbo Superterm Circuit Board (see Figure 15).

Relay Characteristics

The relays on the Turbo Superterm Circuit Board all share the following characteristics:
Form C relay with a contact rating of 2A at 28VDC.
The Normally Open (NO) and the Normally Closed (NC) contacts are the default state of non-energized relays.
Metal oxide varistors (MOVs) are placed across the contacts to reduce electrical noise. The MOVs limit any noise caused by the strike coil to 56 volts.

NOTES: Installing a 56 volt MOV at the strike coil further reduces possible noise input.
Because of this noise, door strike wiring **MUST NOT** be put in the same conduit with other wiring.

Using door strikes with a coil voltage greater than 28VDC or 28VAC requires using external relays that can be driven by Turbo Superterm relays.

Additional MOV's are available form Continental Instruments as part number (RV0005).

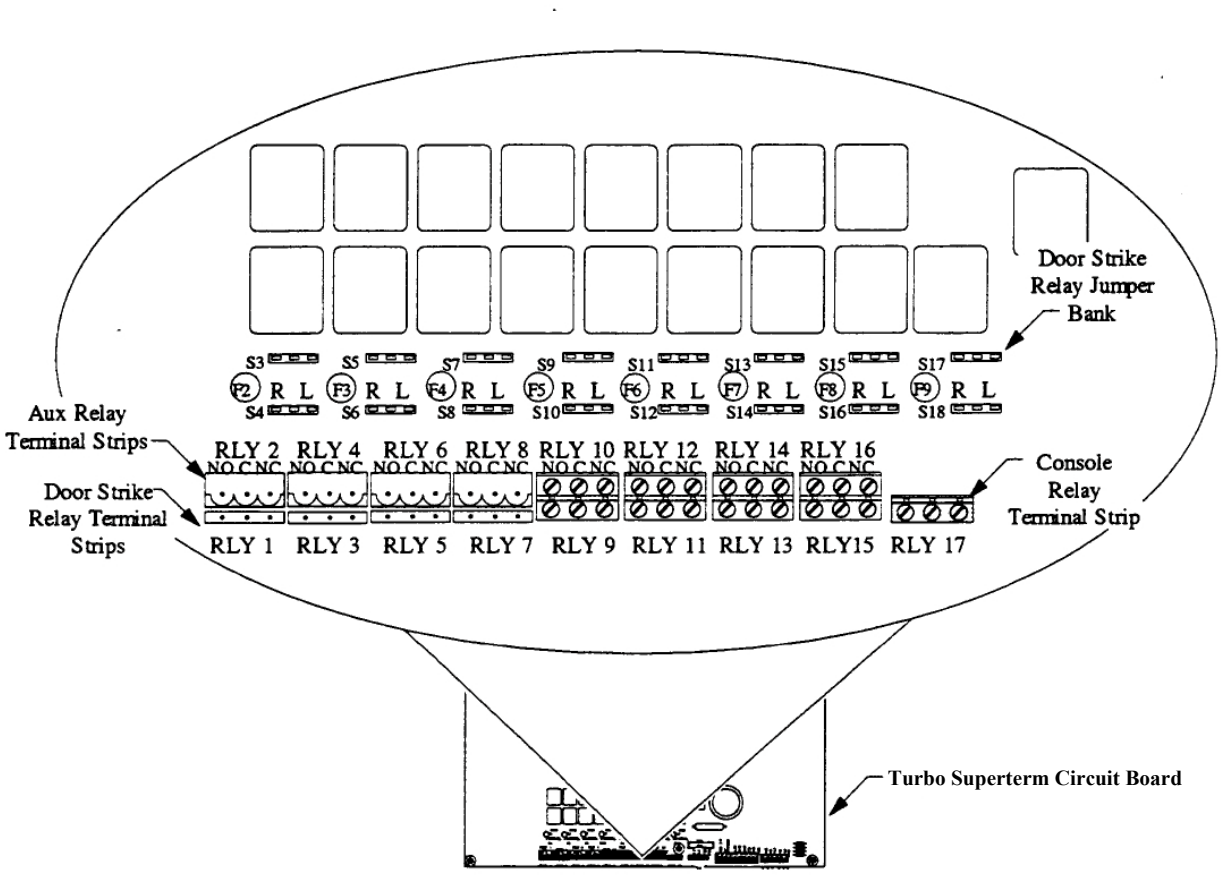


Figure 15 - Turbo Superterm Circuit Board Relay Location

Door Strike Relay Operation

The Turbo Superterm offers two configurations for controlling power to each door strike circuit:

The LOCAL strike power configuration simplifies wiring at the site by using a single power source to operate several door control circuits (see Figure 16). This option is selected by setting a pair of jumpers on the Turbo Superterm printed circuit board.

The REMOTE strike power configuration provides conventional dry-contact outputs, typically controlling a circuit where the power source for the electric lock is near the door controlled by the relay (see Figure 16).

NOTES: Both LOCAL and REMOTE strike power configurations may be mixed on the same Turbo Superterm panel.

Operating door strike relays in either the LOCAL or the REMOTE mode requires setting two jumpers per relay.

The default settings of the jumpers, as shipped from the factory, are the REMOTE power mode. Refer to page 78 (Table 50) for specific information about setting the door strike jumpers.

Relay circuits in the REMOTE configuration are isolated from one another and isolated from the Turbo Superterm power supply.

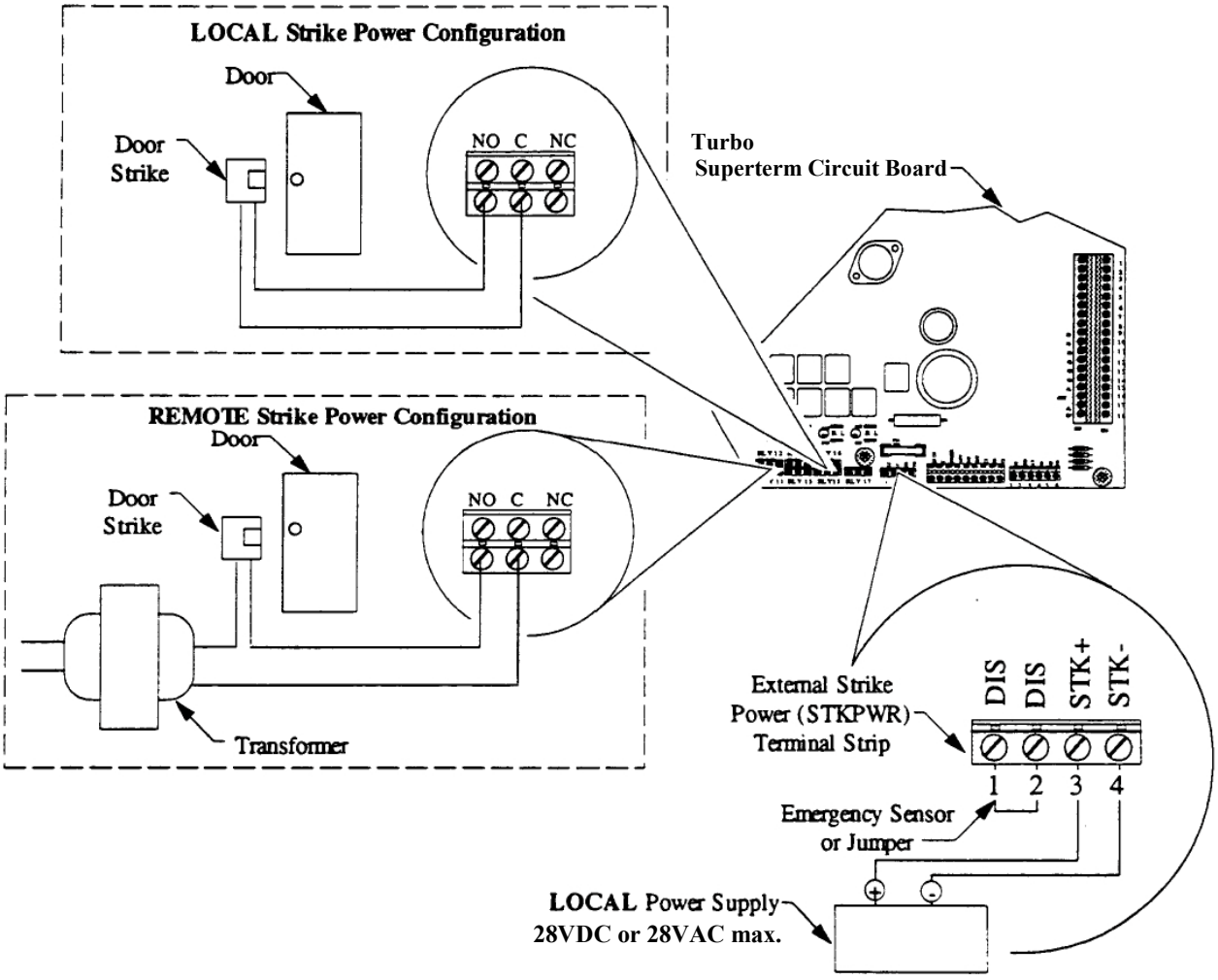


Figure 16 - LOCAL and REMOTE Power Configurations

LOCAL Power Connection

In LOCAL power mode, a single, external power supply (28VDC or 28VAC max.) is mounted outside of and adjacent to the Turbo Superterm cabinet. This supply provides power to a maximum of eight Turbo Superterm door strike relays through the STKPWR terminal strip located on the lower edge of the Turbo Superterm circuit board (see Figure 17).

Strike power is routed through the Turbo Superterm circuit board to the individual relay connectors, thus eliminating the need for separate power supplies at each door.

- The STK- input (STKPWR - Pin 4) is routed to the COMMON (C) relay connection (RLY #X - Pin 2).
- The STK+ input (STKPWR - Pin 3) is routed through the DIS pins (1 and 2) to the Normally Open (NO, RLY #X - Pin 1) or the Normally Closed (NC, RLY #X - Pin 3), depending on the state of the relay.

A Normally Closed (NC) emergency switch may be used in conjunction with the Local power mode to disconnect the strike power upon an emergency situation.

NOTE: Operating a door strike relay in the LOCAL mode requires setting two jumpers per relay. Refer to page 78 (Table 50) for specific information about setting the door strike jumpers.

All door strike relays connected in the LOCAL power configuration operate from the same power source and must have the same voltage rating.

All strike relay circuits (odd numbered relays) are individually fuse protected in both the LOCAL or the REMOTE configuration.

If an emergency sensor is not used, install a jumper between Pin 1 (DIS) and Pin 2 (DIS) on the STKPWR terminal strip.

Table 16 lists the connections between the STKPWR terminal strip and the external power supply (see Figure 17).

Table 16 - Connection Table for External Power Supply	
Power Supply	STKPWR Terminal Strip
Positive (+)	Pin # 3
Negative (-)	Pin #4

Emergency Sensor Connection

An external emergency sensor may be used to disconnect the LOCAL strike power supply if an emergency condition is detected.

The emergency sensor is placed in series with the STK+ signal by connecting it between Pin 1 and Pin 2 of the STKPWR terminal strip (see Figure 18).

NOTES: The emergency sensor must be a Normally Closed (NC) switch and the strike relays must be wired in a Normally Closed (NC) configuration (refer to page 32, LOCAL Power Door Strike Connection).

If an emergency sensor is not used, place a jumper between Pin 1 and Pin 2 on the STKPWR terminal strip (see Figure 17).

Table 17 - Connection Table for Emergency Sensor and External Power Supply	
Device	**STKPWR Terminal Strip**
Emergency Sensor	Pin #1 (DIS)
Emergency Sensor	Pin #2 (DIS)
Power Supply Positive (+)	Pin #3 (STY, +)
Power Supply Negative (-)	Pin #4 (STK -)
NOTE: Normally Closed (NC) emergency sensor connections are not sensitive to polarity.	

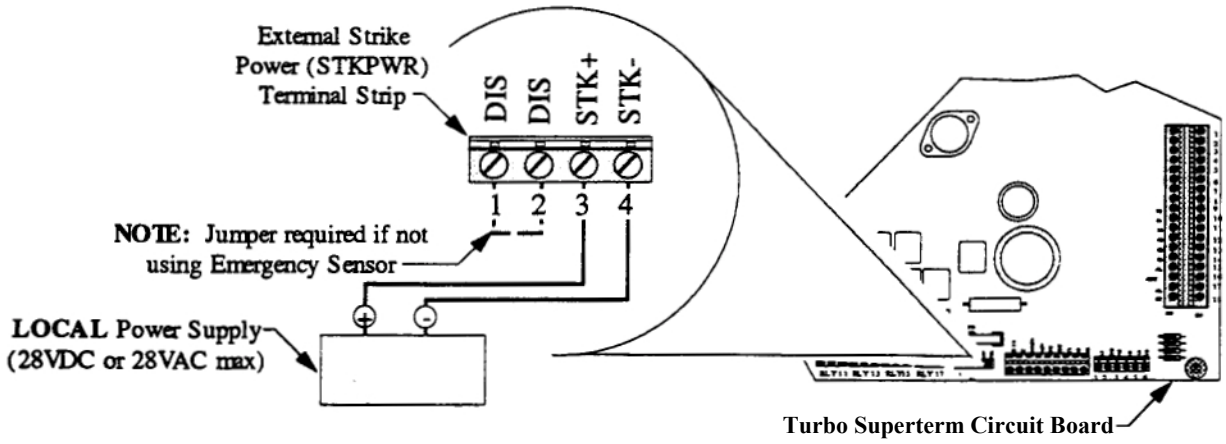


Figure 17 - LOCAL Power Supply Connection

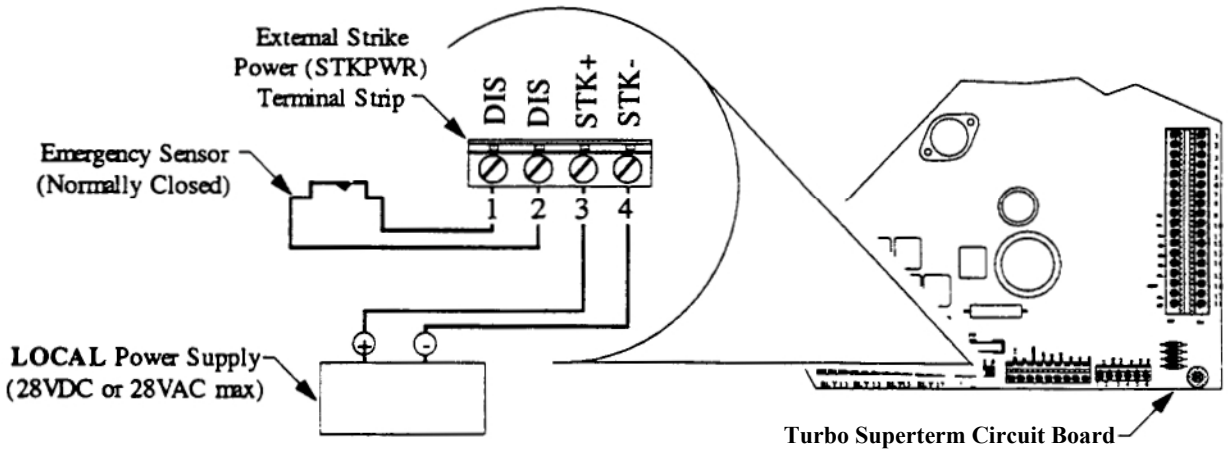


Figure 18 - Emergency Sensor Connection

LOCAL Power Door Strike Connection

All door strike relays operating in LOCAL power mode distribute strike power from the LOCAL power supply. However, each relay may be configured in one of two specific ways.

1. A door strike relay set in a Normally Closed (NC) configuration holds a door strike circuit closed until an event triggers the relay and releases the door strike.

2. A door strike relay set in a Normally Open (NO) configuration keeps a door strike circuit open until an event triggers the relay and engages the door strike.

NOTE: Operating the door strike relays with an emergency sensor requires Normally Closed (NC) conditions (power is disconnected from the door strike in emergency situations).

Door Strike Relay Connection - Normally Open

Table 18 lists the connections between the RLY#x terminal strip and the associated door strike for a Normally Open (NO) condition (see Figure 19).

Table 18 - Connection Table for Door Strike Relay - Normally Open (NO) Condition

Door Strike Signal	RLY#x Pin
Positive (+)	Pin 1
Common (-)	Pin 2

NOTE: Operating door strike relays on LOCAL power requires setting two jumpers per relay. Refer to page 78 (Table 50), Door Strike Jumper Settings, for specific information about setting the jumpers.

Door Strike Relay Connection - Normally Closed

Table 19 lists the connections between the RLY#x terminal strip and the associated door strike for a Normally Closed (NC) condition (see Figure 20).

Table 19 - Connection Table for Door Strike Relay - Normally Closed (NC) Condition

Door Strike Signal	RLY#x Pin
Positive (+)	Pin 3
Common (-)	Pin 2

NOTE: Operating door strike relays on LOCAL power requires setting two jumpers per relay. Refer to page 78 (Table 50), Door Strike Jumper Settings, for specific information about setting the jumpers.

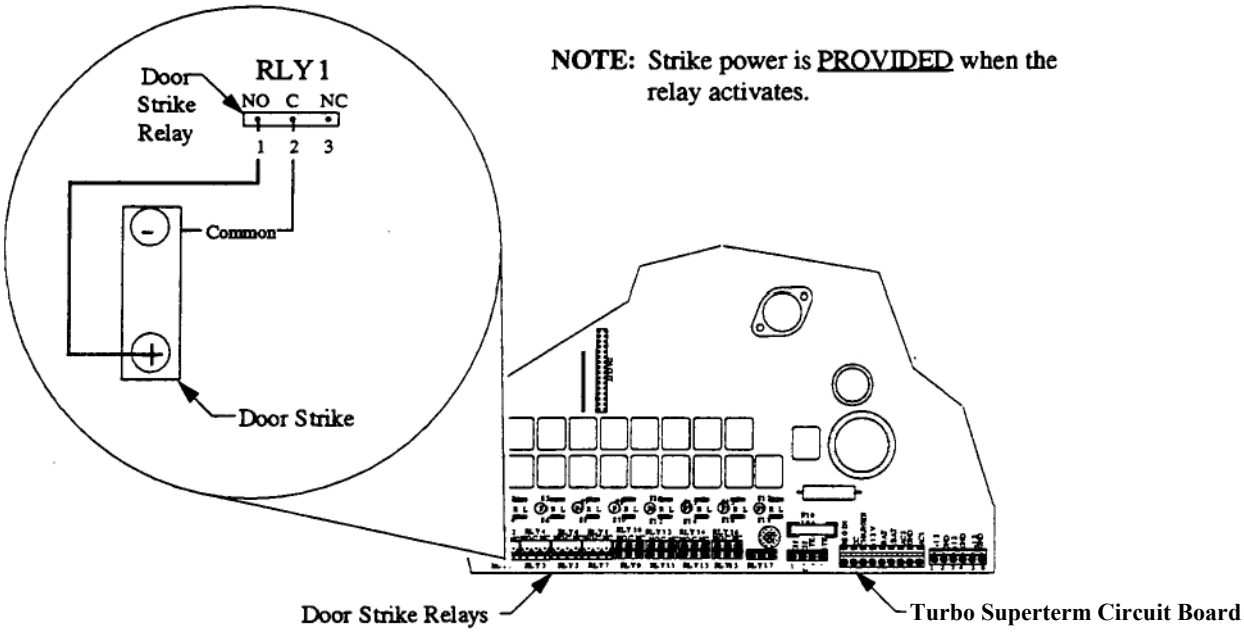


Figure 19 - LOCAL Power Door Strike Relay Connection - Normally Open (NO) Condition

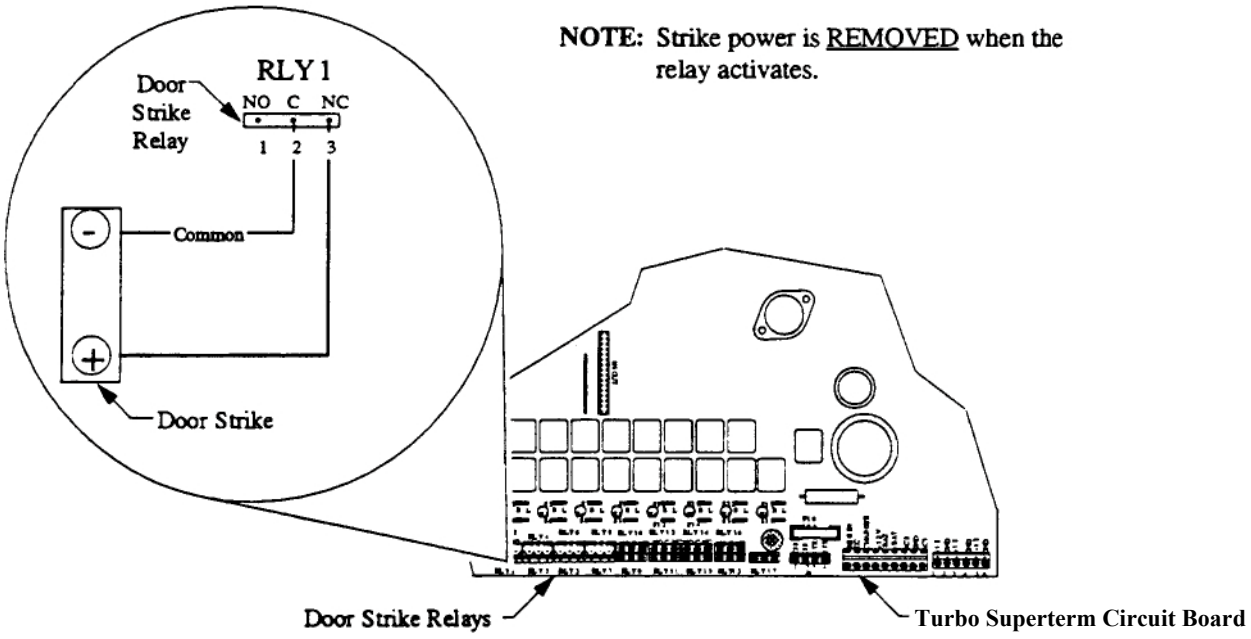


Figure 20 - LOCAL Power Door Strike Relay Connection - Normally Closed (NC) Condition

REMOTE Power Mode

In REMOTE power mode, each door strike operates from an individual power supply (typically a transformer mounted at the door site). In the REMOTE power mode, the door strike relays operate as conventional dry contacts and may be configured as Normally Open (NO) or Normally Closed (NC).

NOTES: Door strike relays operating in the REMOTE mode do not respond to an emergency sensor.

Operating a door strike relay in the REMOTE mode requires setting two jumpers per relay. Refer to page 78 for specific information about setting the door strike jumpers.

Door Strike Relay Connection - Normally Open

Table 20 lists the connections between the RLY#x terminal strip and the door strike for a Normally Open (NO) relay condition (see Figure 21).

Table 20 - Connection Table for Door Strike Relay - Normally Open (NO) Condition

Door Strike Signal	RLY#x
Positive (+)	Pin 1
Common (-)	Pin 2

NOTE: Operating door strike relays on REMOTE power requires setting two jumpers per relay. Refer to page 78, Door Strike Jumper Settings, for specific information about setting the jumpers.

Door Strike Relay Connection - Normally Closed

Table 21 lists the connections between the RLY#x terminal strip and the door strike for a Normally Closed (NC) relay condition (see Figure 22).

Table 21 - Connection Table for Door Strike Relay - Normally Closed (NC) Condition

Door Strike Signal	RLY#x
Positive (+)	Pin 3
Common (-)	Pin 2

NOTE: Operating door strike relays on REMOTE power requires setting two jumpers per relay. Refer to page 78, Door Strike Jumper Settings, for specific information about setting the jumpers.

Auxiliary Relay Connection

The Turbo Superterm supports eight auxiliary relays for controlling external devices including, door alarm shunts, cameras, temperature controls, intercoms, area lighting, or any other device using electrical inputs to change the status of a control circuit.

Auxiliary devices only connect to even numbered Turbo Superterm relays. The eight relays are located on the bottom center of the Turbo Superterm circuit board above the door strike relays.

The eight auxiliary relays are labeled: RLY 2; RLY 4; RLY 6; RLY 8; RLY 10; RLY 12; RLY 14; RLY 16.

Auxiliary Relay Power Requirements

The Turbo Superterm does not provide on-board power to the eight auxiliary relays. Each auxiliary relay may be used to switch an external signal.

Auxiliary Relay Connection - Normally Open (NO)

Table 22 lists the connections for an Auxiliary relay in a normally open configuration.

Table 22 - Connection Table for Auxiliary Relay - Normally Open (NO) Condition

Signal	RLY#x
Normally Open	Pin 1
Common	Pin 2

Aux Relay Connection - Normally Closed (NC)

Table 23 lists the connections for an Auxiliary relay in a normally closed configuration.

Table 23 - Connection Table for Auxiliary Relay - Normally Closed (NC) Condition

Signal	RLY#x
Normally Closed	Pin 3
Common	Pin 2

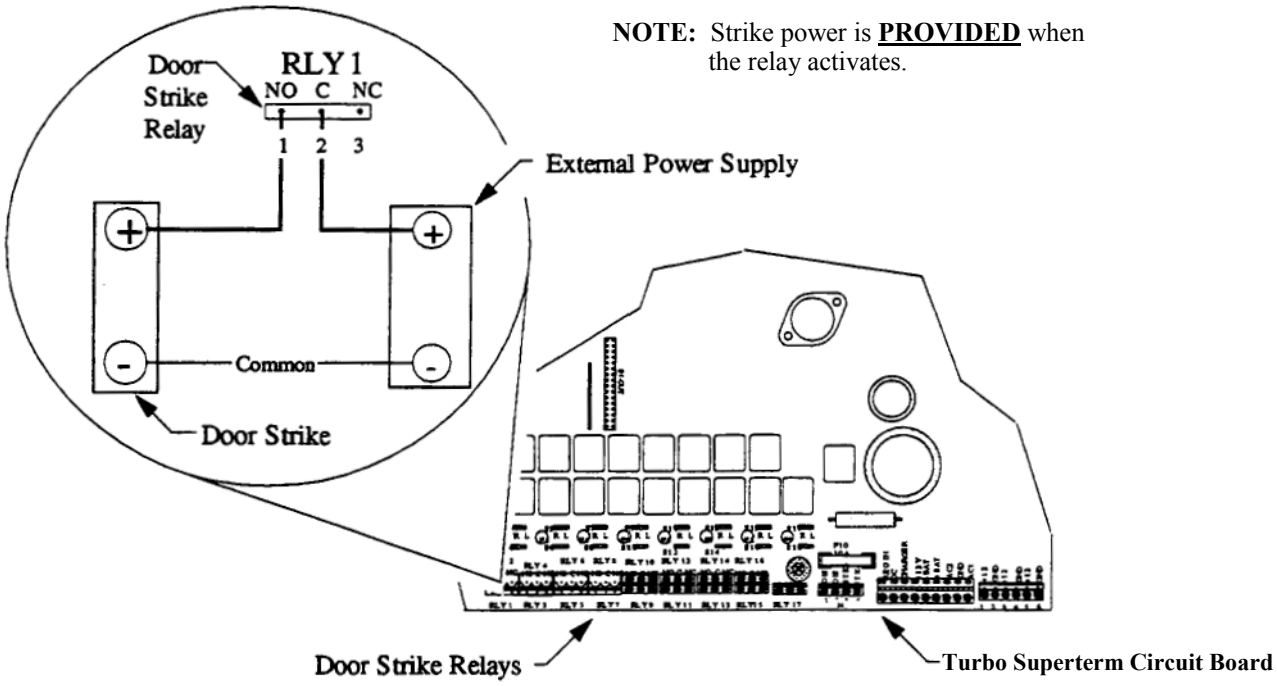


Figure 21 - REMOTE Power Fail Secure Door *Strike* Relay Connection - Normally Open (NO) Condition

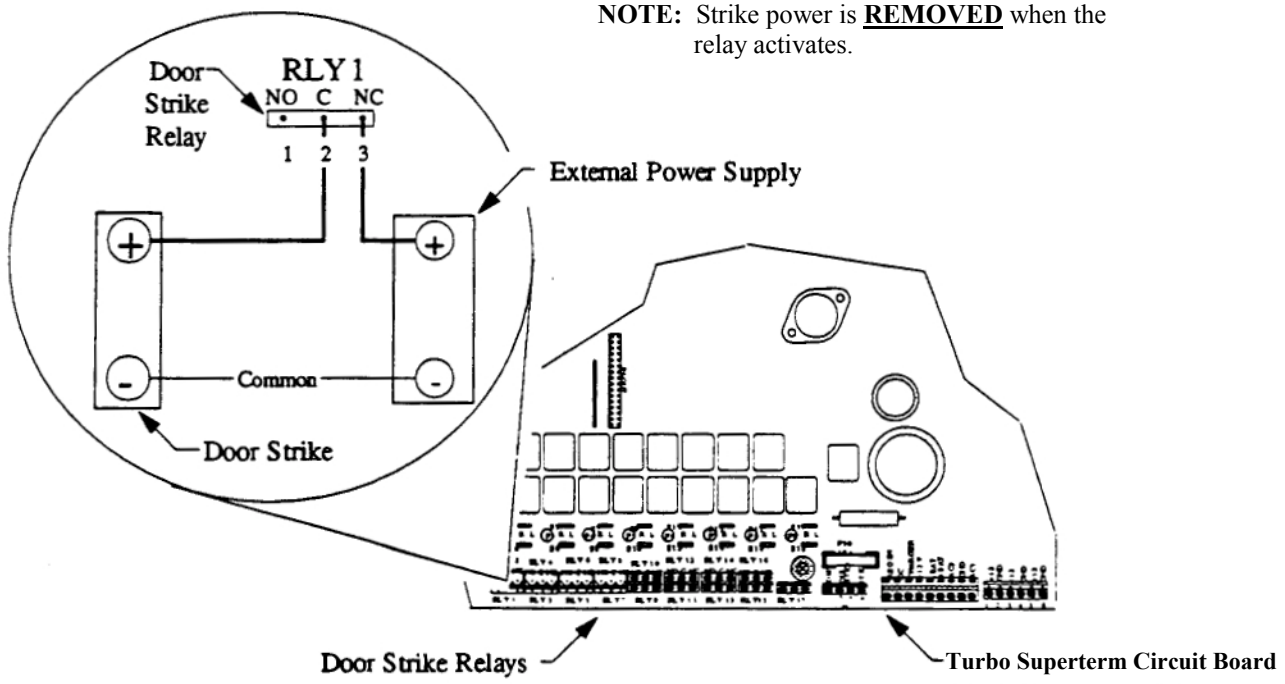


Figure 22 - REMOTE Power Magnetic Lock or Fail Safe Door Strike Relay Connection - Normally Closed (NC) Condition

AUXILIARY POWER

The AUX POWER terminal strip (labeled 12_V) provides +12VDC power outlets for a maximum of three expansion I/O option boards or auxiliary devices. The AUX POWER terminal strip is located in the lower right-hand corner of the Turbo Superterm circuit board (see Figure 23). For specific information regarding expansion boards, refer to page 56, Expansion Input/Output Boards.

Table 24 lists the AUX POWER terminal strip pin numbers and their associated functions.

Table 24 - AUX POWER (12_V) Terminal Strip Functions

Pin	Function
1	+12
2	GND
3	+12
4	GND
5	+12
6	GND

NOTE: +12VDC current draw is limited to a total maximum value of 0.50 Amps for the basic Turbo Superterm version (without Expansion Power Supply) and 1.60 Amps for the Expanded Turbo Superterm Version (with Expansion Power Supply).

WARNING
Verify that the main power to the Turbo Superterm circuit board is OFF before connecting any optional devices.

WARNING
Observe Positive and Negative wire polarity between option boards and the Turbo Superterm.

Additional +12VDC Power Outlets

An additional eight + 12VDC outlets are available (if not being used for readers) for powering accessories including motion detectors and +12V alarm devices.

The third pin (Pin 3) of the DR1 through DR8 terminal strips provides +12VDC to suitable access control accessories (see Figure 24).

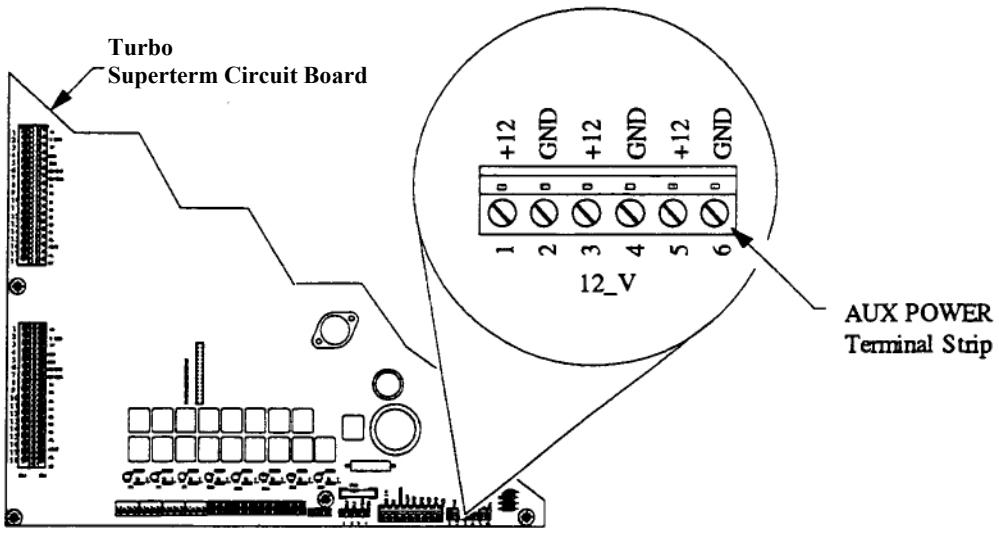


Figure 23 - Onboard +12VDC Power Supply Outlets

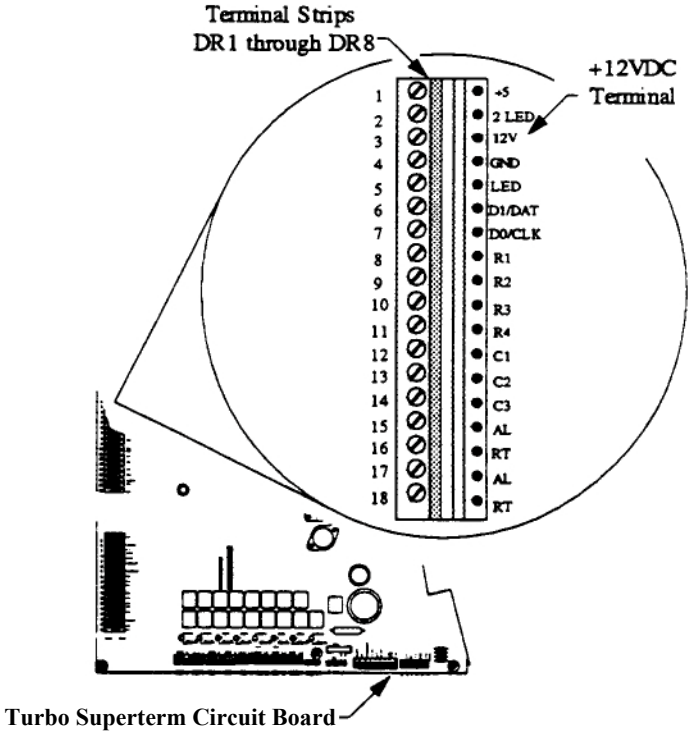


Figure 24 - Additional +12VDC Power Supply Outlets

ALARM CONNECTION

The Turbo Superterm has a total of 24 supervised alarm inputs. Sixteen alarm inputs are located on the DR1 through DR8 terminal strips, and are used for Request-to-Exit and Door Status sensor functions (see pages 24 and 25).

An additional eight auxiliary alarm inputs are located on the ALARM terminal strip located on the upper left-hand comer of the Turbo Superterm circuit board (see Figures 25 and 26). These auxiliary alarm inputs may be used for dry contact type inputs (unsupervised) or supervised alarms.

Supervised Alarms

Supervised alarms provide monitoring of alarm inputs for fault or tamper conditions. Three additional alarm states may be detected by installing two-1K Ohm) resistors near the alarm contacts.
In addition to the standard Normal and Abnormal alarm conditions, the supervised alarms report Open, Closed, and Fault conditions.

- An **Open** condition is the result of a cut wire.
- A **Closed** condition is the result of shorting the alarm contacts together.
- A **Fault** condition is the result of grounding one of the alarm wires.

Configuring an Alarm in the Supervised Condition

1) Use two 1K Ohm, 1/4W, ±5% carbon film resistors per alarm.
2) Install R 1 in parallel with the alarm contacts (see Figure 26).
3) Install R2 in series with the alarm input conductor.

NOTE: For maximum protection, install the resistors close to the alarm contacts and embed them in epoxy.

Table 25 lists the ALARM terminal strip pin numbers and the respective signals.

Table 25 - ALARM Terminal Strip Input Pins

Pin	Signal
1	AL 17
2	RT17
3	AL18
4	RT18
5	AL 19
6	RT19
7	AL20
8	RT20
9	AL21
10	RT21
11	AL22
12	RT22
13	AL23
14	RT23
15	AL24
16	RT24

Alarm Cable Requirements

Connecting alarm sensors to the Turbo Superterm board requires 22 AWG, stranded, shielded, cables with drain wires.

NOTE: DO NOT use twisted pair wires.

CAUTION
Keep all drain and cable shield wires between the Turbo Superterm and Keypads short. Connect drain and cable shield wires to the ground posts located on both sides of Turbo Superterm cabinet. DO NOT ground drain wires and cable shields at any other point.

Tamper Switch

The Turbo Superterm cabinet has a built-in tamper switch. The tamper switch is factory wired and requires no adjustment.

NOTE: When the Tamper Switch closes, all LEDs will extinguish (except AC on LBD1). Refer to page 80, LED Diagnostics, for more specific information.

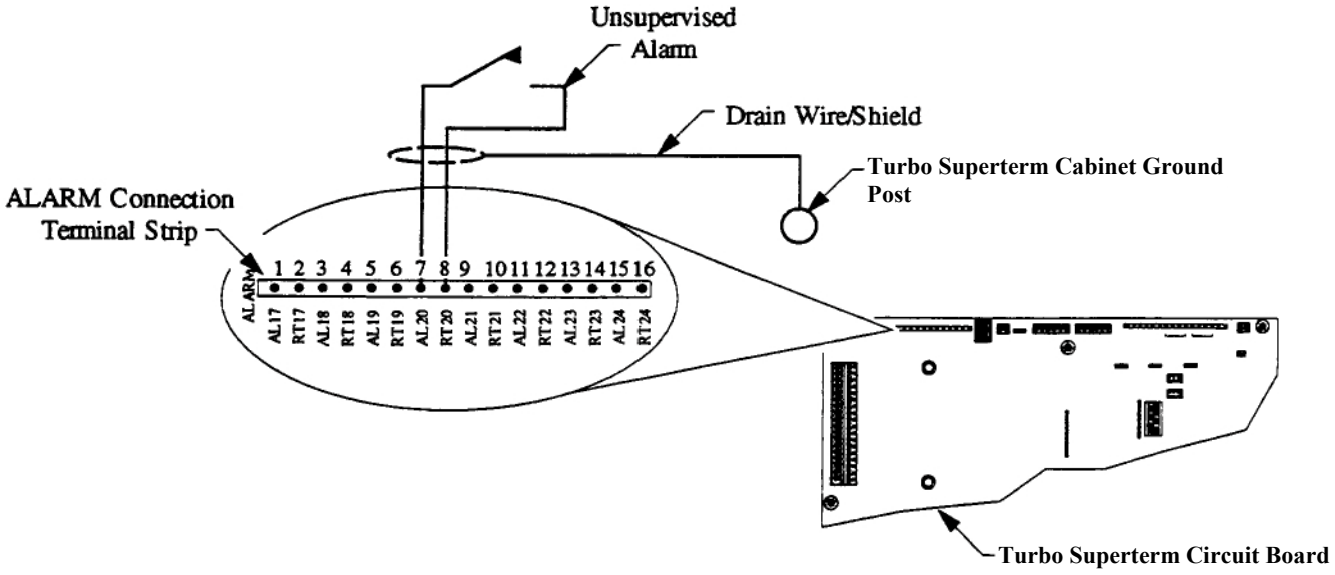

Unsupervised
Alarm
Drain Wire/Shield
Turbo Superterm Cabinet Ground
Post
ALARM Connection
Terminal Strip
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ALARM
AL17 RT17 AL18 RT18 AL19 RT19 AL20 RT20 AL21 RT21 AL22 RT22 AL23 RT23 AL24 RT24
Turbo Superterm Circuit Board

Figure 25 - ALARM Terminal Strip - Unsupervised Alarm Condition

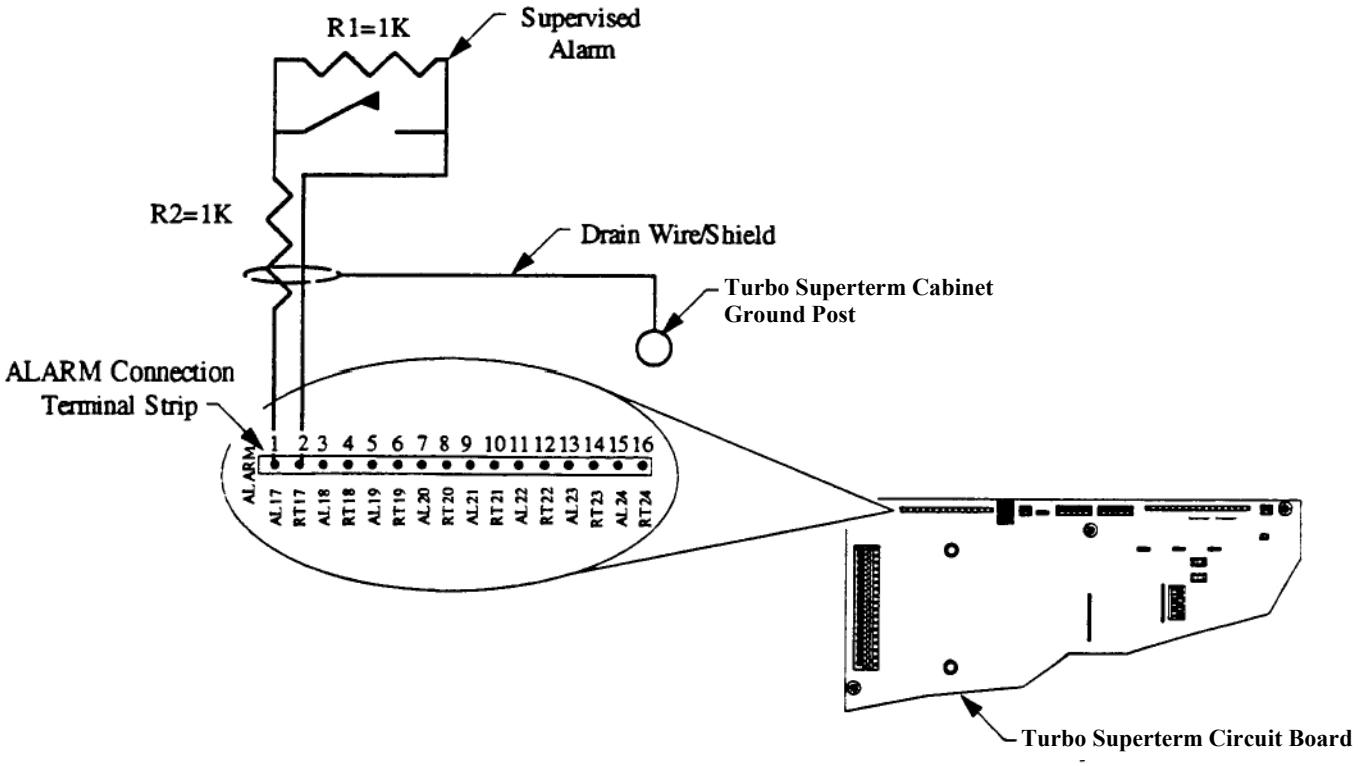

R1=1K
Supervised
Alarm
R2=1K
Drain Wire/Shield
Turbo Superterm Cabinet
Ground Post
ALARM Connection
Terminal Strip
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ALARM
AL17 RT17 AL18 RT18 AL19 RT19 AL20 RT20 AL21 RT21 AL22 RT22 AL23 RT23 AL24 RT24
Turbo Superterm Circuit Board

Figure 26 - ALARM Terminal Strip - Supervised Alarm Condition

COMMUNICATION CONNECTION

RS-232 Communications - Host Computer/ Modem

Operating as a stand-alone system, the Turbo Superterm communicates with a host computer (directly or through a modem) through the RS-232 channel.

Proper RS-232 communications require observing the EIA standard pin definitions of Data Terminal Equipment (DTE) and Data Control Equipment (DCE).

NOTE: All RS-232 equipment made by Continental Instruments LLC, including the Turbo Superterm, are configured as DTE devices.

RS-232 Cable Requirements

RS-232 communications between the Turbo Superterm and a host computer/modem require stranded, 3 conductor, 22 AWG cable with shielding and a drain wire.
NOTE: DO NOT use twisted pair wires.

Table 26 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the host computer.

Table 26 - RS-232 Cable Gauge-vs-Length

Unit	Distance	Wire Gauge
Host Computer/ Modem	50ft (15.2m) (Maximum)	22AWG Shielded w/Drain

NOTES: A host computer is typically connected to the RS-232 cable using either a DB9-S or a DB25-S connector. Modems are typically connected to the RS-232 cable using a DB25-P connector.

Address Setting

Operating the Turbo Superterm on the RS-232 channel requires setting a board address on DIP switch S 1 (address zero is not valid). Refer to page 42, Network Address Setting, For specific information.

Turbo Superterm to Host Computer/Modem Connection

Figure 27 shows a direct Turbo Superterm-to-host computer connection.

Figure 28 shows a Turbo Superterm-to-host computer connection through a modem.

NOTE: Set switch position 7 of Dip Switch S 1 on the Turbo Superterm to OFF when using a modem. Refer to page 42, for specific instructions on setting the S 1 DIP switch.

1) Connect the **Transmit** pin of the RS-232 device to POLL terminal strip pin number 4 (labeled RxD) (see Figure 28).
2) Connect the **Receive** pin of the RS-232 device to POLL terminal strip pin number 5 (labeled TxD).
3) Connect the **Ground** pin of the RS-232 device to POLL terminal strip pin number 6 (labeled GND).
4) Connect the RS-232 cabling drain wire/shield to GROUND at the host computer/modem end of the cable. ***Do Not*** connect the drain wire at the Turbo Superterm end of the cable.

Table 27 lists the connections between the POLL terminal strip and a host computer.

Table 27 - Connection Table for Host Computer

Signal	Turbo Superterm POLL Pin #	Host Computer DB9-S pin	Host Computer DB25-S pin
TXD	4	2	3
RXD	5	3	2
GND	6	5	7

Table 28 lists the connections between the Turbo Superterm POLL terminal strip and a modem.

Table 28 - Connection Table for Modem

Signal	Turbo Superterm POLL Pin#	Modem DB25-P
TXD	4	2
RXD	5	3
GND	6	7

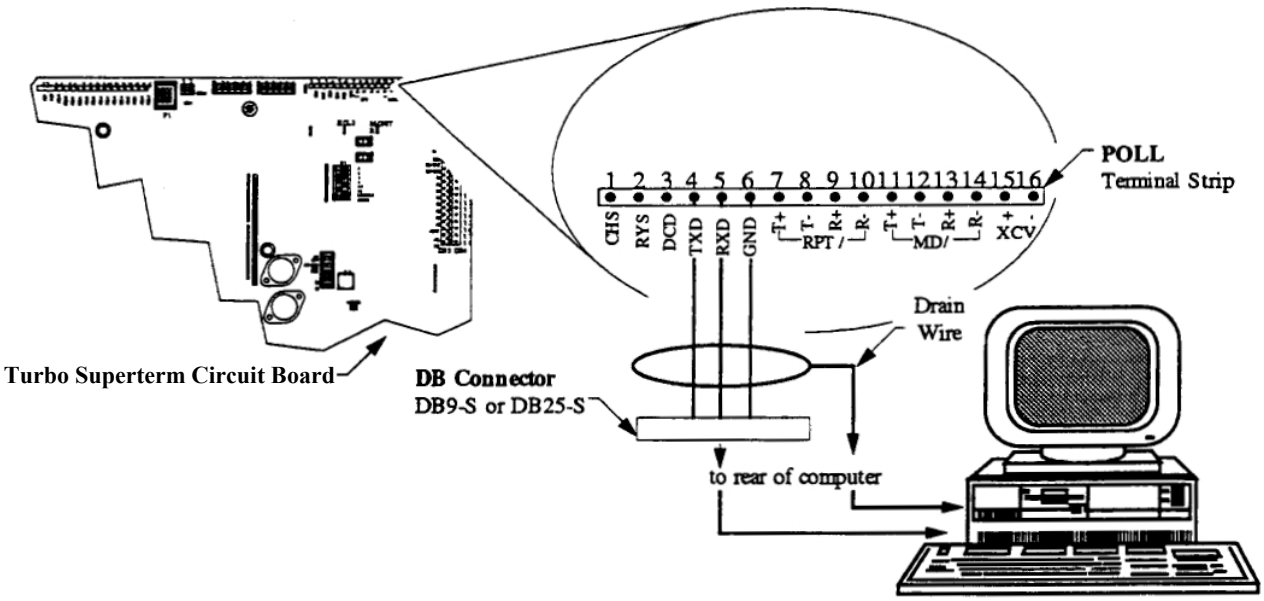


Figure 27 - Turbo Superterm-to-Host Computer Connection

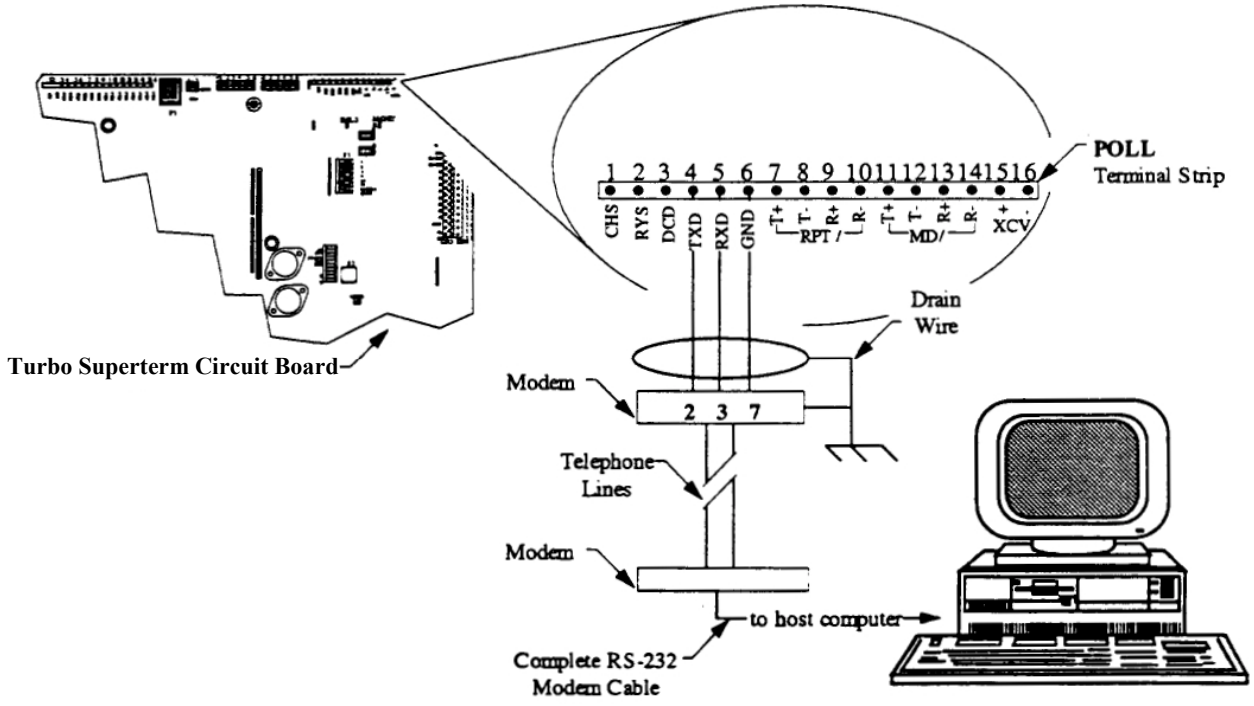


Figure 28 - Turbo Superterm-to-Modem-to-Computer Connection

Networking

The Turbo Superterm can be networked with a maximum of 62 other Turbo Superterm units or other Continental Instruments access control devices (Superterm, Smarterm, Miniterm, Microterm and Super Two). **NOTE:** Multidrop networks are limited to 32 access control devices.
The following network configurations are possible:

RS-232 to RS-422 Networks
RS-232 to RS-422 REPEAT Network
RS-232 to RS-422 MULTIDROP Network

RS-422 to RS-422 Networks
RS-422 to RS-422 REPEAT Network
RS-422 to RS-422 MULTIDROP Network

NOTES: If the first Turbo Superterm in the network is *less than 50* feet (15.2m) from the host computer, the first Turbo Superterm in the network may be used to convert the RS-232 polling signal to RS-422 for the remainder of the network.
If the first Turbo Superterm in the network is *more than 50* feet (15.2m) from the host computer, an RS-422 polling line converter is required.

Network Jumper Settings

The MODE1 and the EOL2 jumpers on each Turbo Superterm must be set depending on the type of network configuration.

Refer to page 72 for specific information regarding the EOL2 jumper.

Refer to page 76 for specific information regarding the MODE 1 jumper.

Network Cable Requirements

Networking multiple Turbo Superterms requires 4-conductor cable (2-two wire twisted pair), stranded, 22AWG, with shielding, and drain wire.

For REPEAT network configurations, cable length between EACH Turbo Superterm is restricted to a maximum length of 4000 feet (1220m).

For MULTIDROP network configurations, a maximum of 9 panels can be installed with a total cable length of 4000 feet (1220m). A pair of line drivers is required for every 9 panels--installing a pair of line drivers after the 9th panel will allow you to expand an additional 9 panels and 4000 feet (1220m) of cable. Line drivers can be ordered using part number CICE1940PL-1.

Network Address Settings

Operating the Turbo Superterm with a host computer, or in a network, requires that each Turbo Superterm (and other devices) have an individual, unique address other than zero.

An 8-position DIP switch labeled S 1 mounted on the Turbo Superterm Circuit Board determines each Turbo Superterm's address (see Figure 29).

Table 29 lists 63 Turbo Superterm address switch positions.

NOTES: Address switch (S I) positions 7 and 8 are not used for networks connected directly to a host computer. Set both switches to the ON position.
If the network is connected to the host computer through a modem, the first Turbo Superterm in the network must have switch position 7 (Modem) set to the OFF position. All other Turbo Superterm units in the network must have switch position 7 set to ON.
Addresses shown in Figure 29 are for example purposes only.

Note: Panels on Modems should start with Physical Address # 1 with each new Node to assure proper Panel to Host Dialup.

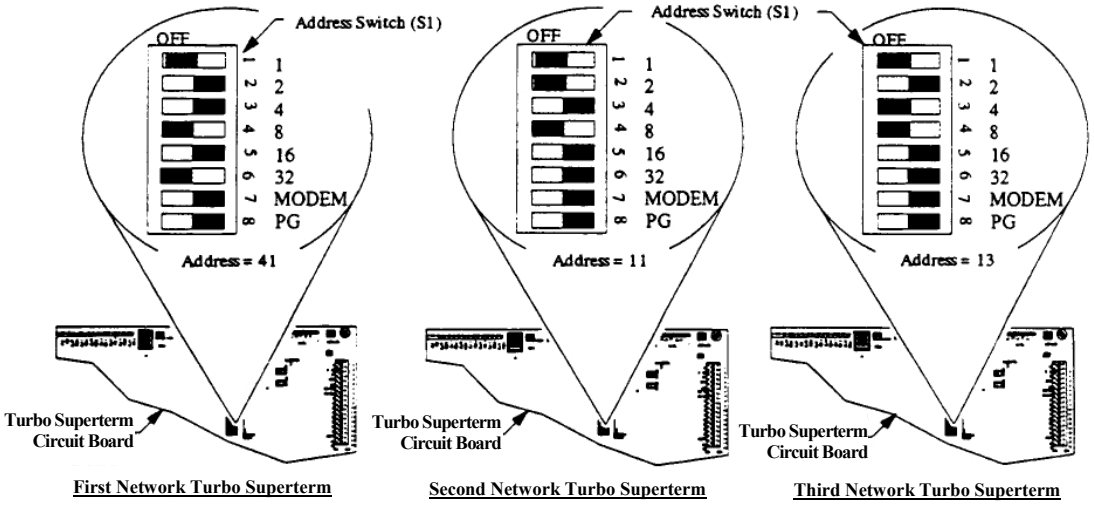


Figure 29 - Turbo Superterm Address Switch (S I) Location

Table 29 - Turbo Superterm Address Switch (S1) Positions

Turbo Superterm Number	Address Switch Position Number					
	1	2	3	4	5	6
1	OFF	ON	ON	ON	ON	ON
2	ON	OFF	ON	ON	ON	ON
3	OFF	OFF	ON	ON	ON	ON
4	ON	ON	OFF	ON	ON	ON
5	OFF	ON	OFF	ON	ON	ON
6	ON	OFF	OFF	ON	ON	ON
7	OFF	OFF	OFF	ON	ON	ON
8	ON	ON	ON	OFF	ON	ON
9	OFF	ON	ON	OFF	ON	ON
10	ON	OFF	ON	OFF	ON	ON
11	OFF	OFF	ON	OFF	ON	ON
12	ON	ON	OFF	OFF	ON	ON
13	OFF	ON	OFF	OFF	ON	ON
14	ON	OFF	OFF	OFF	ON	ON
15	OFF	OFF	OFF	OFF	ON	ON
16	ON	ON	ON	ON	OFF	ON
17	OFF	ON	ON	ON	OFF	ON
18	ON	OFF	ON	ON	OFF	ON
19	OFF	OFF	ON	ON	OFF	ON
20	ON	ON	OFF	ON	OFF	ON
21	OFF	ON	OFF	ON	OFF	ON
22	ON	OFF	OFF	ON	OFF	ON
23	OFF	OFF	OFF	ON	OFF	ON
24	ON	ON	ON	OFF	OFF	ON
25	OFF	ON	ON	OFF	OFF	ON
26	ON	OFF	ON	OFF	OFF	ON
27	OFF	OFF	ON	OFF	OFF	ON
28	ON	ON	OFF	OFF	OFF	ON
29	OFF	ON	OFF	OFF	OFF	ON
30	ON	OFF	OFF	OFF	OFF	ON
31	OFF	OFF	OFF	OFF	OFF	ON
32	ON	ON	ON	ON	ON	OFF
33	OFF	ON	ON	ON	ON	OFF
34	ON	OFF	ON	ON	ON	OFF
35	OFF	OFF	ON	ON	ON	OFF
36	ON	ON	OFF	ON	ON	OFF
37	OFF	ON	OFF	ON	ON	OFF
38	ON	OFF	OFF	ON	ON	OFF
39	OFF	OFF	OFF	ON	ON	OFF
40	ON	ON	ON	OFF	ON	OFF
41	OFF	ON	ON	OFF	ON	OFF
42	ON	OFF	ON	OFF	ON	OFF
43	OFF	OFF	ON	OFF	ON	OFF
44	ON	ON	OFF	OFF	ON	OFF
45	OFF	ON	OFF	OFF	ON	OFF
46	ON	OFF	OFF	OFF	ON	OFF
47	OFF	OFF	OFF	OFF	ON	OFF
48	ON	ON	ON	ON	OFF	OFF
49	OFF	ON	ON	ON	OFF	OFF
50	ON	OFF	ON	ON	OFF	OFF
51	OFF	OFF	ON	ON	OFF	OFF
52	ON	ON	OFF	ON	OFF	OFF
53	OFF	ON	OFF	ON	OFF	OFF
54	ON	OFF	OFF	ON	OFF	OFF
55	OFF	OFF	OFF	ON	OFF	OFF
56	ON	ON	ON	OFF	OFF	OFF
57	OFF	ON	ON	OFF	OFF	OFF
58	ON	OFF	ON	OFF	OFF	OFF
59	OFF	OFF	ON	OFF	OFF	OFF
60	ON	ON	OFF	OFF	OFF	OFF
61	OFF	ON	OFF	OFF	OFF	OFF
62	ON	OFF	OFF	OFF	OFF	OFF
63	OFF	OFF	OFF	OFF	OFF	OFF

RS-232 to RS-422 REPEAT Network

If the first Turbo Superterm in the network is less than 50 feet (15.2m) from the host computer, it may be used to convert the RS-232 polling signal from the host to RS-422 for the remainder of the network.

- Connect the first Turbo Superterm to the RS-232 port of the host computer.
- Connect the remainder of the network using the Turbo Superterm's RS-422 ports.

Refer to Figure 30 for a typical REPEAT mode network connection diagram.
Table 30 lists the required connections for an RS-232 to RS-422 REPEAT network.

RS-232 to RS-422 REPEAT Jumper Setting

To convert an RS-232 signal to an RS-422 signal, the first Turbo Superterm unit in the network must be in REPEAT mode.

Operating a Turbo Superterm network in the REPEAT mode requires setting the MODE 1 and EOL2 jumpers.

Refer to page 76 for information regarding setting the MODE1 jumper.

Refer to page 72 for information regarding setting the EOL2 jumper.

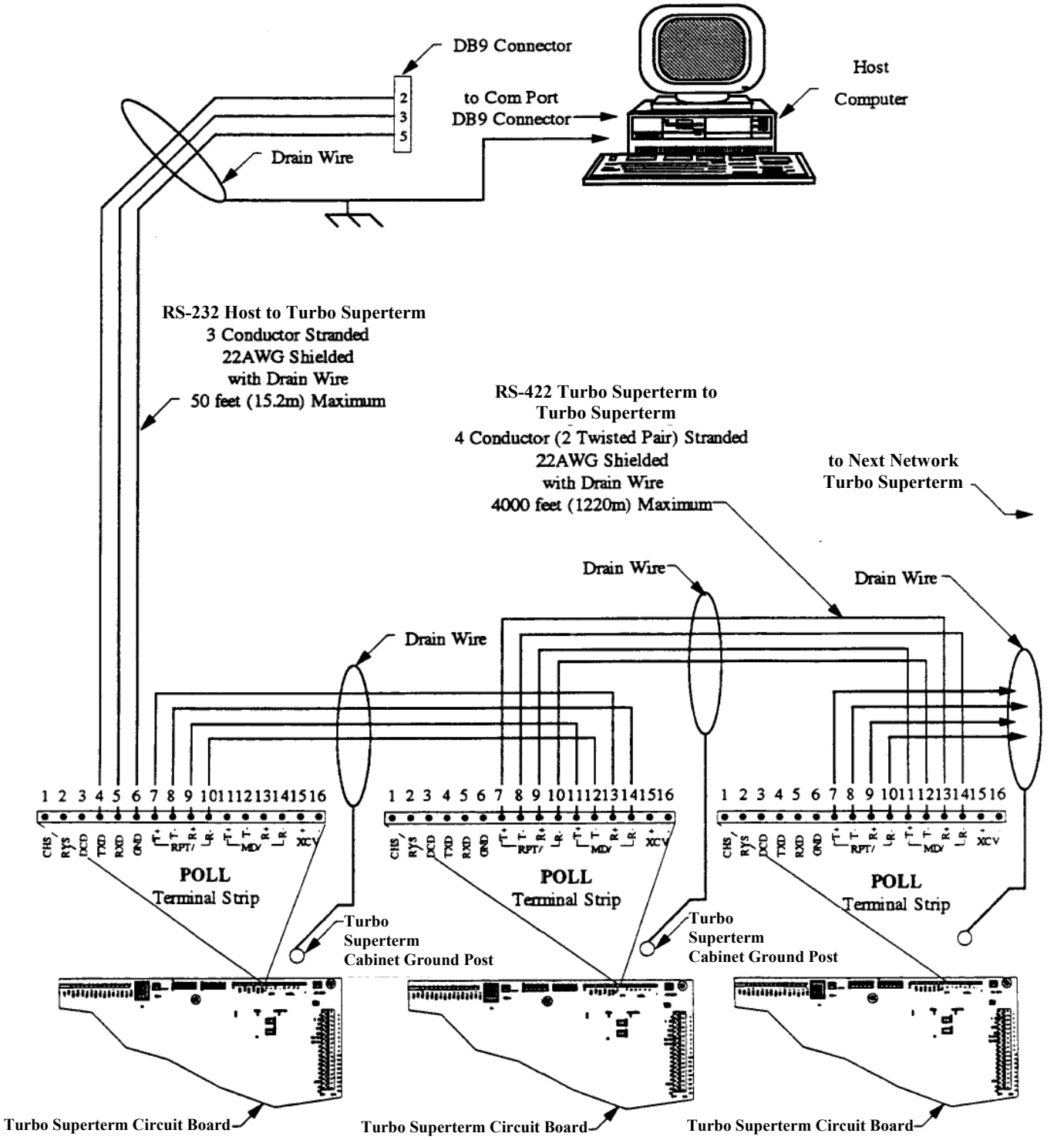
RS-232 to RS-422 REPEAT Drain Wires

The drain wires for all RS-422 cables in the network must be grounded to the individual Turbo Superterm's Cabinet Ground Post (see Figure 30). Ground RS-422 cables at the end closest to the host computer.

NOTE: Ground the drain wire for the RS-232 cables at the host computer end of the cable.

Table 30 - RS-232 to RS-422 REPEAT Network Connections

Host Computer	**Turbo Superterm #1**	**Turbo Superterm #2**	**Turbo Superterm 3#**	**Turbo Superterm #4**	**to next Turbo Superterm**
	MODE1 Jumper = REPEAT EOL2 jumper = IN	MODE1 Jumper = REPEAT EOL2 jumper = IN	MODE1 Jumper = REPEAT EOL2 jumper = IN	MODE1 Jumper = REPEAT EOL2 jumper = IN	MODE1 Jumper = REPEAT EOL2 jumper = IN
Signal	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin
RS-232 RXD RS-232 TXD RS-232 GND	POLL 4 (TXD) POLL 5 (RXD) POLL 6 (GND)				
	POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)			
		POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+ POLL 12 (MD/T-)		
			POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)	>>>> >>>> >>>> >>>>



First Network Turbo Superterm
REPEAT Mode
MODE 1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper= IN (pins 1 and 2)

Second Network Turbo Superterm
REPEAT Mode
MODE1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper = IN (pins 1 and 2)

Third Network Turbo Superterm
REPEAT Mode
MODE 1 Jumper =RPT (pins 1 and 2)
EOL2 Jumper = IN (pins 1 and 2)

Figure 30 - Turbo Superterm RS-232 -to- RS-422 REPEAT Network Connection

RS-232 to RS-422 MULTIDROP Network

Figure 31 shows the required connections for an RS-232 to RS-422 MULTIDROP network.

- Connect the first Turbo Superterm to the RS-232 port of the host computer.
- Connect the remainder of the network using the Turbo Superterm's RS-422 ports.

Table 31 lists the required connections for an RS-232 to RS-422 MULTIDROP network.

RS-232 to RS-422 MULTIDROP Drain Wires

The drain wires for all RS-422 cables in a MULTIDROP network must be connected together (isolated from the boards) and connected to the ground post at the FIRST Turbo Superterm in the network (the Turbo Superterm unit CLOSEST to the host computer).

RS-232 to RS-422 MUTIDROP Jumper Setting

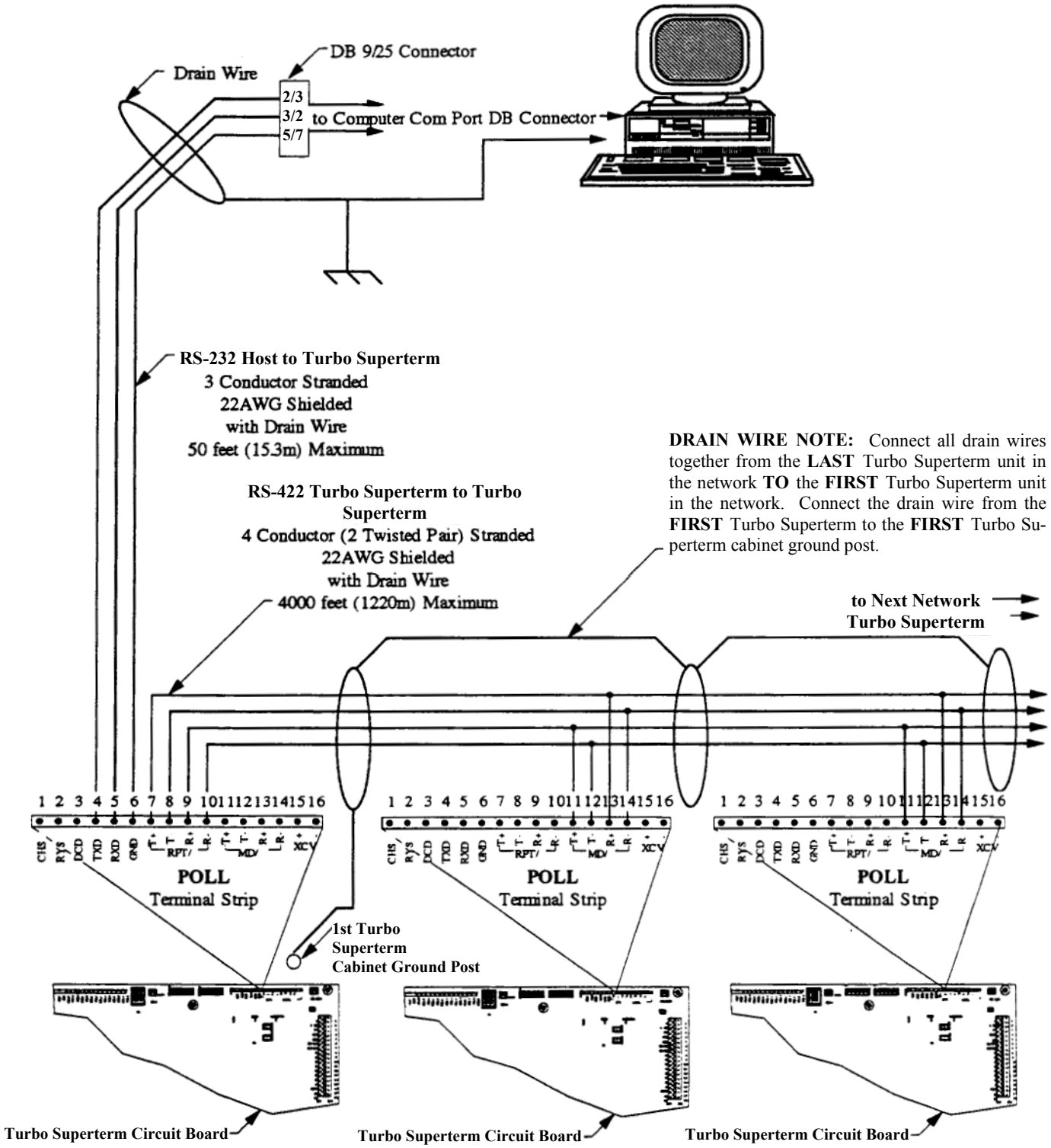
Operating a Turbo Superterm network in the MULTIDROP mode requires setting the MODE 1 and EOL2 jumpers.

Refer to page 76 for information regarding setting the MODE1 jumper.

Refer to page 72 for information regarding setting the EOL2 jumper.

Table 31- RS-232 to RS-422 MULTIDROP Network Connections

Host Computer	Turbo Superterm #1	Turbo Superterm #2	Turbo Superterm 3#	Last Turbo Superterm
	MODE 1 jumper = RPT EOL2 jumper = IN	MODE 1 jumper = MD EOL2 jumper = OUT	MODE 1 jumper = MD EOL2 jumper = OUT	MODE 1 jumper = MD EOL2 jumper = IN
Signal	**Connector/Pin**	**Connector/Pin**	**Connector/Pin**	**Connector/Pin**
RS-232 RXD RS-232 TXD RS-232 GND	POLL 4 (TXD) POLL 5 (RXD) POLL 6 (GND)			
	POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11(MD/T+ POLL 12 (MD/T-)	>> POLL 13 (MD/R+) >> POLL 14 (MD/R-) >> POLL 11 (MD/T+) >> POLL 12 (MD/T-)


DB 9/25 Connector
Drain Wire
2/3
3/2
5/7
to Computer Com Port DB Connector
RS-232 Host to Turbo Superterm
3 Conductor Stranded
22AWG Shielded
with Drain Wire
50 feet (15.3m) Maximum
RS-422 Turbo Superterm to Turbo Superterm
4 Conductor (2 Twisted Pair) Stranded
22AWG Shielded
with Drain Wire
4000 feet (1220m) Maximum
DRAIN WIRE NOTE: Connect all drain wires together from the LAST Turbo Superterm unit in the network TO the FIRST Turbo Superterm unit in the network. Connect the drain wire from the FIRST Turbo Superterm to the FIRST Turbo Superterm cabinet ground post.
to Next Network
Turbo Superterm
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
POLL
Terminal Strip
1st Turbo
Superterm
Cabinet Ground Post
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board

First Network Turbo Superterm
REPEAT Mode
MODE1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper= IN (pins 1 and 2)

Second Network Turbo Superterm
MULTIDROP Mode
MODE 1 Jumper= MD (pins 2 and 3)
EOL2 Jumper = OUT (pins 2 and 3)

Third Network Turbo Superterm
MULTIDROP Mode
MODE1 Jumper= MD (pins 2 and 3)
EOL2 Jumper = OUT (pins 2 and 3)
NOTE: Set the EOL2 jumper for the last

Figure 31 - Turbo Superterm RS-232 -to- RS-422 MULTIDROP Network Connection

RS-422 to RS-422 REPEAT Network

If the first Turbo Superterm in a network is more than 50 feet (15.2m) from the host computer, the polling line from the host computer must use RS-422 standards.

A Continental Instruments RS-422 Polling Line Converter may be used at the host computer to convert RS-232 to RS-422.

Figure 32 shows the required connections for an RS-422-to RS-422 REPEAT network.

Table 32 lists the necessary connections between:

- A host computer and the first Turbo Superterm in the network,

and

- The first Turbo Superterm in the network and the remaining Turbo Superterm (62 maximum) in a network.

RS-422 to RS-422 REPEAT Drain Wires

Ground the drain wires for all RS-422 cables in the network at each individual Turbo Superterm in the network.

RS-422 to RS-422 REPEAT Jumper Setting

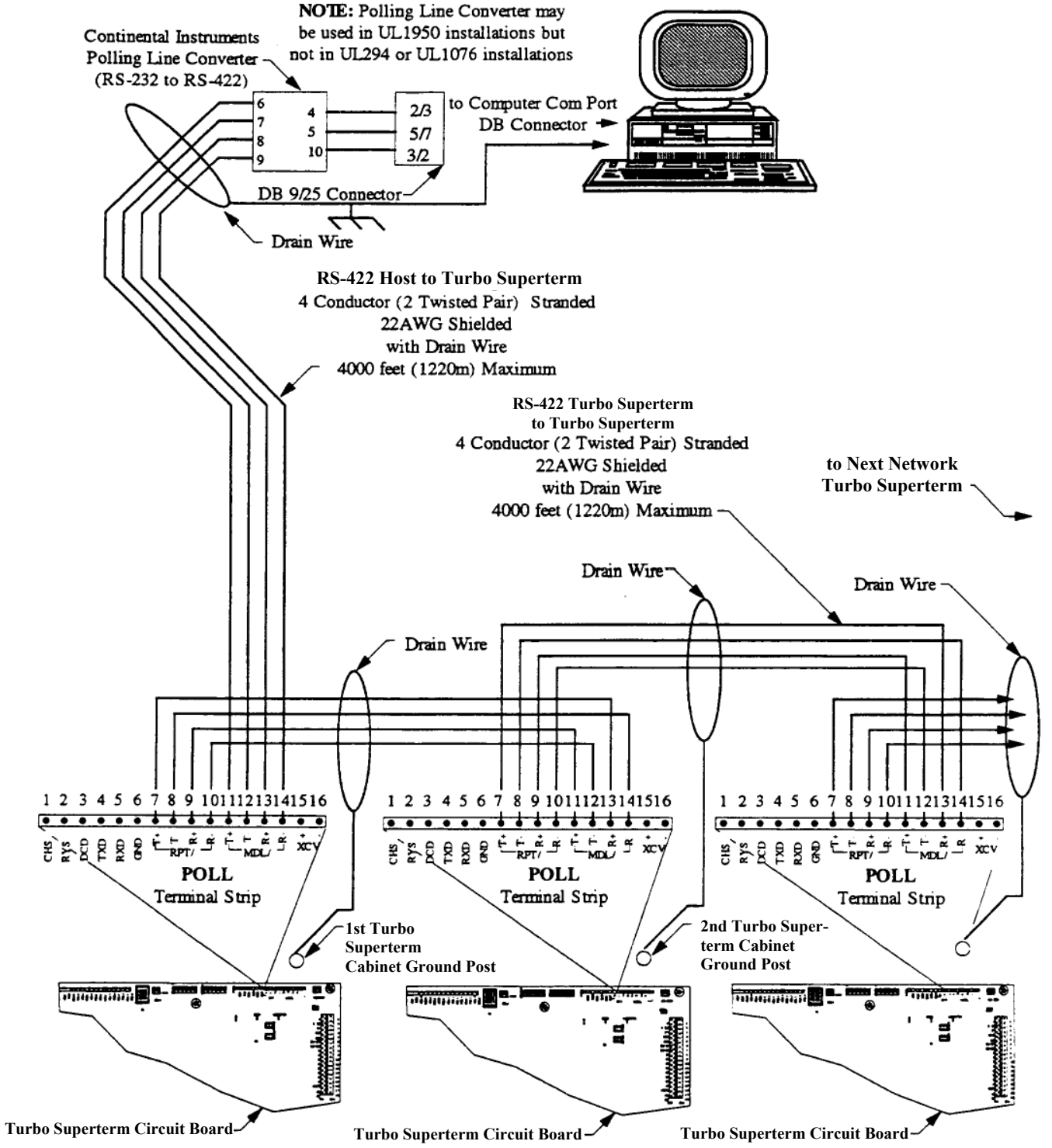
Operating a Turbo Superterm network in the REPEAT mode requires setting the MODE 1 jumper and the EOL2 jumper.

Refer to page 76 for information regarding setting the MODE1 jumper.

Refer to page 72 for information regarding setting the EOL2 jumper.

Table 32 - RS-422 to RS-422 REPEAT Network Connections

Host Computer	**Turbo Superterm #1**	**Turbo Superterm #2**	**Turbo Superterm 3#**	**Turbo Superterm #4**	**next Turbo Superterm**
	MODE1 jumper= RPT EOL2 jumper = IN	MODE1 jumper= RPT EOL2 jumper = IN	MODE1 jumper= RPT EOL2 jumper = IN	MODE1 jumper= RPT EOL2 jumper = IN	MODE1 jumper= RPT EOL2 jumper = IN
Signal	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin
RS-422 TXD+ RS-422 TXD- RS-422 RXD+ RS-422 RXD-	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)				
	POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+ POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)			
		POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+ POLL 12 (MD/T-)		
			POLL 7 (RPT/T+) POLL 8 (RPT/T-) POLL 9 (RPT/R+) POLL 10 (RPT/R-)	POLL 13 (MD/R+) POLL 14 (MD/R-) POLL 11 (MD/T+) POLL 12 (MD/T-)	>>>> >>>> >>>> >>>>


NOTE: Polling Line Converter may be used in UL1950 installations but not in UL294 or UL1076 installations
Continental Instruments Polling Line Converter (RS-232 to RS-422)
6 7 8 9
4 5 10
2/3 5/7 3/2
to Computer Com Port DB Connector
DB 9/25 Connector
Drain Wire
RS-422 Host to Turbo Superterm
4 Conductor (2 Twisted Pair) Stranded
22AWG Shielded
with Drain Wire
4000 feet (1220m) Maximum
RS-422 Turbo Superterm to Turbo Superterm
4 Conductor (2 Twisted Pair) Stranded
22AWG Shielded
with Drain Wire
4000 feet (1220m) Maximum
to Next Network Turbo Superterm
Drain Wire
Drain Wire
Drain Wire
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
CHS/RYS DCD TXD RXD GND T+ T- R+ R- RPT/ T+ T- R+ R- MDL/ LR + XCV
POLL Terminal Strip
1st Turbo Superterm Cabinet Ground Post
2nd Turbo Superterm Cabinet Ground Post
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board

First Network Turbo Superterm
REPEAT Mode
MODE 1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper= IN (pins 1 and 2)

Second Network Turbo Superterm
REPEAT Mode
MODE 1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper = IN (pins 1 and 2)

Third Network Turbo Superterm
REPEAT Mode
MODE 1 Jumper = RPT (pins 1 and 2)
EOL2 Jumper = IN (pins 1 and 2)

Figure 32 - Turbo Superterm RS-422 to RS-422 REPEAT Network Connection

RS-422 to RS-422 MULTIDROP Network

Figure 33 shows the required connections for an RS-422-toRS-422 MULTIDROP network.

Table 33 lists the necessary connections between:

- A host computer and the first Turbo Superterm in the network,

and

- The first Turbo Superterm in the network and the following Turbo Superterms (32 maximum) in a network.

RS-422 to RS-422 MULTIDROP Drain Wires

Ground the drain wires for all RS-422 cables in the network to the Turbo Superterm ground posts.

NOTE: Connect all drain wires together starting at the LAST Turbo Superterm in the network and working toward the FIRST Turbo Superterm in the network.

Connect the drain wire from the FIRST Turbo Superterm in the network to the drain wire at the Polling Line Converter (see Figure 33).
Connect the drain wire from the Polling Line Converter to the ground at the rear of the host computer.

RS-422 to RS-422 MULTIDROP Jumper Setting

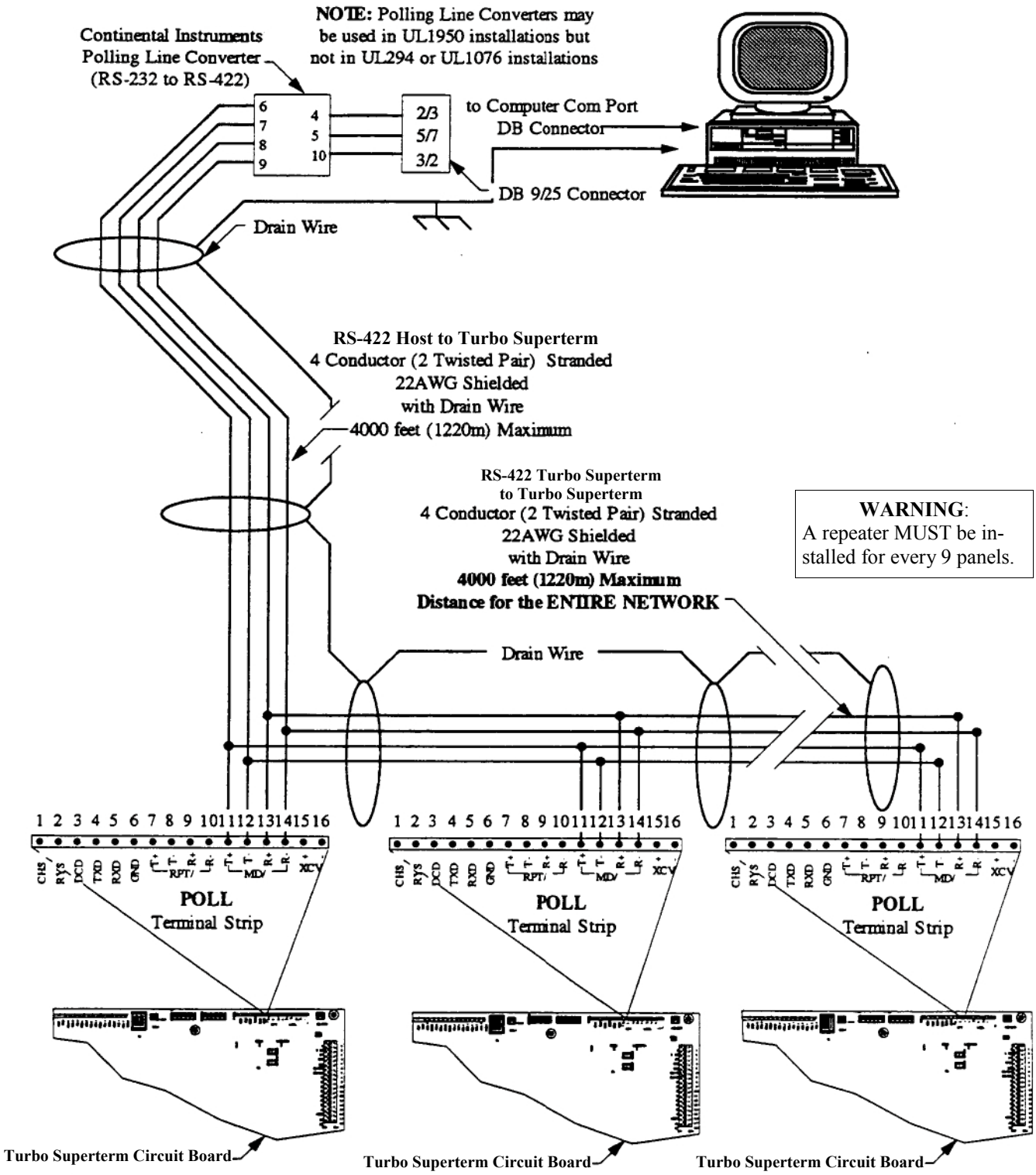
Operating a Turbo Superterm network in the MULTIDROP mode requires setting the MODE 1 and EOL2 jumpers.

Refer to page 76 for information regarding setting the MODE I jumper.

Refer to page 72 for information regarding setting the EOL2 jumper.

Table 33 - RS-422 to RS-422 MULTIDROP Network Connections

Host Computer	Turbo Superterm #1	Turbo Superterm #2	Turbo Superterm 3#	Turbo Superterm #4	Last Turbo Superterm
	MODE1 jumper= MD EOL2 jumper = OUT	MODE1 jumper= MD EOL2 jumper = OUT	MODE1 jumper= MD EOL2 jumper = OUT	MODE1 jumper= MD EOL2 jumper = OUT	MODE1 jumper= MD EOL2 jumper = IN
Signal	**Connector/Pin**	**Connector/Pin**	**Connector/Pin**	**Connector/Pin**	**Connector/Pin**
RS-422 TXD+	POLL 13 (MD/R+)	POLL 13 (MD/R+)	POLL 13 (MD/R+)	POLL 13 (MD/R+)	>> POLL 13 (MD/R+)
RS-422 TXD-	POLL 14 (MD/R-)	POLL 14 (MD/R-)	POLL 14 (MD/R-)	POLL 14 (MD/R-)	>> POLL 14 (MD/R-)
RS-422 RXD+	POLL 11 (MD/T+)	POLL 11 (MD/T+)	POLL 11 (MD/T+	POLL 11 (MD/T+)	>> POLL 11 (MD/T+)
RS-422 RXD-	POLL 12 (MD/T-)	POLL 12 (MD/T-)	POLL 12 (MD/T-)	POLL 12 (MD/T-)	>> POLL 12 (MDT-)


NOTE: Polling Line Converters may be used in UL1950 installations but not in UL294 or UL1076 installations
Continental Instruments Polling Line Converter (RS-232 to RS-422)
6 7 8 9
4 5 10
2/3 5/7 3/2
to Computer Com Port DB Connector
DB 9/25 Connector
Drain Wire
RS-422 Host to Turbo Superterm
4 Conductor (2 Twisted Pair) Stranded
22AWG Shielded
with Drain Wire
4000 feet (1220m) Maximum
RS-422 Turbo Superterm to Turbo Superterm
4 Conductor (2 Twisted Pair) Stranded
22AWG Shielded
with Drain Wire
4000 feet (1220m) Maximum
Distance for the ENTIRE NETWORK
WARNING:
A repeater MUST be installed for every 9 panels.
Drain Wire
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
CHS / RYS DCD TXD RXD GND T+ T- R+ R- RPT/ LR T+ T- R+ R- MD/ LR XCV
POLL Terminal Strip
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board
Turbo Superterm Circuit Board

First Network Turbo Superterm
MULTIDROP Mode
MODE 1 Jumper= MD (pins 2 and 3)
EOL2 Jumper = OUT (pins 2 and 3)

Second Network Turbo Superterm
MULTIDROP Mode
MODE 1 Jumper = MD (pins 2 and 3)
EOL2 Jumper = OUT (pins 2 and 3)

Last Network Turbo Superterm
MULTIDROP Mode
MODE 1 Jumper= MD (pins 2 and 3)
EOL2 Jumper = IN (pins 1 and 2)

Figure 33- RS-422 to RS-422 MULTIDROP Network Connection

Auxiliary Communications Channels

The Turbo Superterm has three additional terminal strips for use with auxiliary RS-232 and RS-485 devices. The COM1 and COM2 terminal strips are RS-232 channels for use with printers, CRTs and other similar devices. The XTM port is used with RS-485 devices.

NOTE: Only two of the three auxiliary channels may be used at the same time. The COM 1 terminal strip is always enabled while the COM2 or the XTM terminal strip is selected via a jumper.

COM1 Terminal Strip Connection

A printer connects to the COM1 terminal strip via a DB25-P connector (see Figure 34).
Connect the COM1 RS-232 cable drain wire/shield to GROUND at the printer end of the cable. DO NOT connect the drain wire/shield at the Turbo Superterm end of the cable.

Table 34 lists the connections between the COM1 terminal strip and a printer.

Note: Functionality of COM1 may vary with Firmware and may not be available on all versions.

Table 34 - Connection Table for COM1 Terminal Strip

COM1 Pin #	Function	DB-25P Pin #
4	TXD	3
5	RXD	2
6	GND	7

Printer Cable Requirements

Printer-to-Turbo Superterm connections require a 22AWG, 3 conductor, stranded, shielded cable with drain wire.

NOTE: Cable length between the Turbo Superterm and a printer is limited to a maximum of 50ft (15m).

Table 35 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and a printer.

Table 35 -- Cable Requirements for Printer Connection

Unit	Distance (maximum)	Wire Gauge
Printer	50 ft/15m	22AWG Shielded w/drain

Printer Setup Parameters

Proper operation between the Turbo Superterm and a printer requires that the printer be set to the following parameters:

Baud Rate:	9600
Parity:	None
Data Bits:	8
Stop Bits:	1

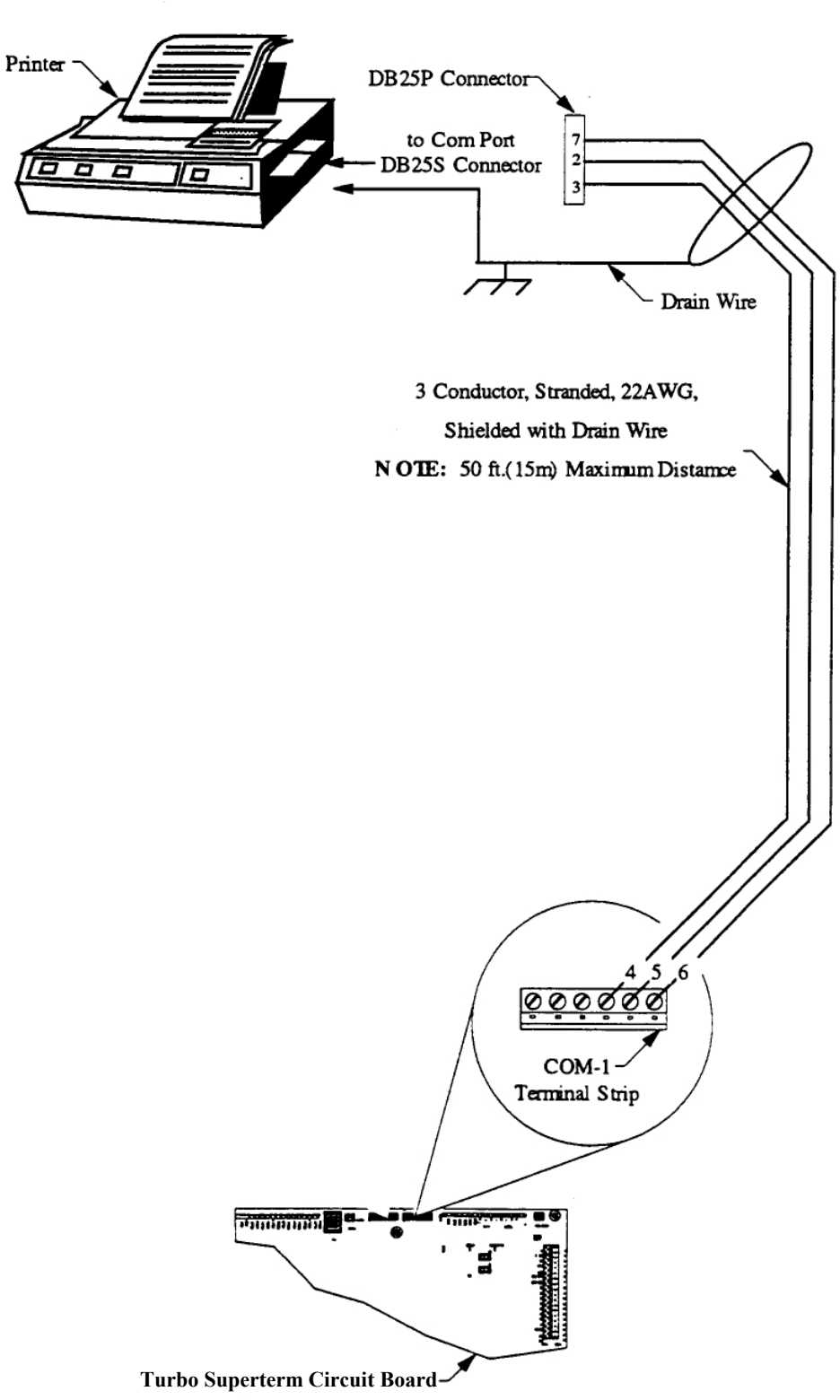


Figure 34- COM1 Terminal Strip Connection

COM2 Terminal Strip Connection

An auxiliary RS-232 device connects to the Turbo Superterm through the COM2 terminal strip (see Figure 35).

Table 36 lists the connections between the COM2 terminal strip and a RS-232 device.

Table 36 - Connection Table for COM2 Terminal Strip

COM2 Pin #	Function
4	TXD
5	RXD
6	GND

NOTE: Proper operation of the Turbo Superterm and an RS-232 device requires setting the COM2 jumper. Refer to page 74 for specific information regarding setting the COM2 jumper.

RS-232 Cable Requirements

RS-232 device connections to the COM2 terminal strip require a 22AWG, 3-conductor, stranded, shielded cable with drain wire.
NOTE: Cable length between the Turbo Superterm and an RS-232 device is limited to a maximum of 50 ft (15m).

Table 37 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the RS-232 device.

Table 37 - Cable Requirements for RS-232 Connection

Unit	Distance (maximum)	Wire Gauge
RS-232 Device	50 ft/15m	22AWG Shielded w/drain

XTM Terminal Strip Connections

An auxiliary RS-485 device connects to the Turbo Superterm through the XTM terminal strip (see Figure 35).

Table 38 lists the connections between the XTM terminal strip and a RS-485 device.

Table 38 - Connection Table for XTM Terminal Strip

XTM Pin #	Function
1	XTM+
2	XTM-

NOTE: Proper operation of the Turbo Superterm and an RS-485 device requires setting the COM2 jumper. Refer to page 74 for specific information regarding setting the COM2 jumper.

RS-485 Cable Requirements

RS-485 connections to the XTM terminal strip require a 22AWG, 2-conductor, stranded, shielded cable with drain wire.

NOTES: The drain wire/shield connects to the Turbo Superterm cabinet ground post (see Figure 35).

Cable length between the Turbo Superterm and an RS-485 device is limited to a maximum of 4000 ft (1220m).

Table 39 lists the cable gauge-vs-length requirements for proper operation of the Turbo Superterm and the RS-485 device.

Table 39 -- Cable Requirements for RS-485 Connection

Unit	Distance (maximum)	Wire Gauge
RS-485 Device	4000 ft/1220m	22AWG Shielded w/drain

Note: Functionality of COM2 and XTM Terminal may vary with Firmware and may not be available on all versions.

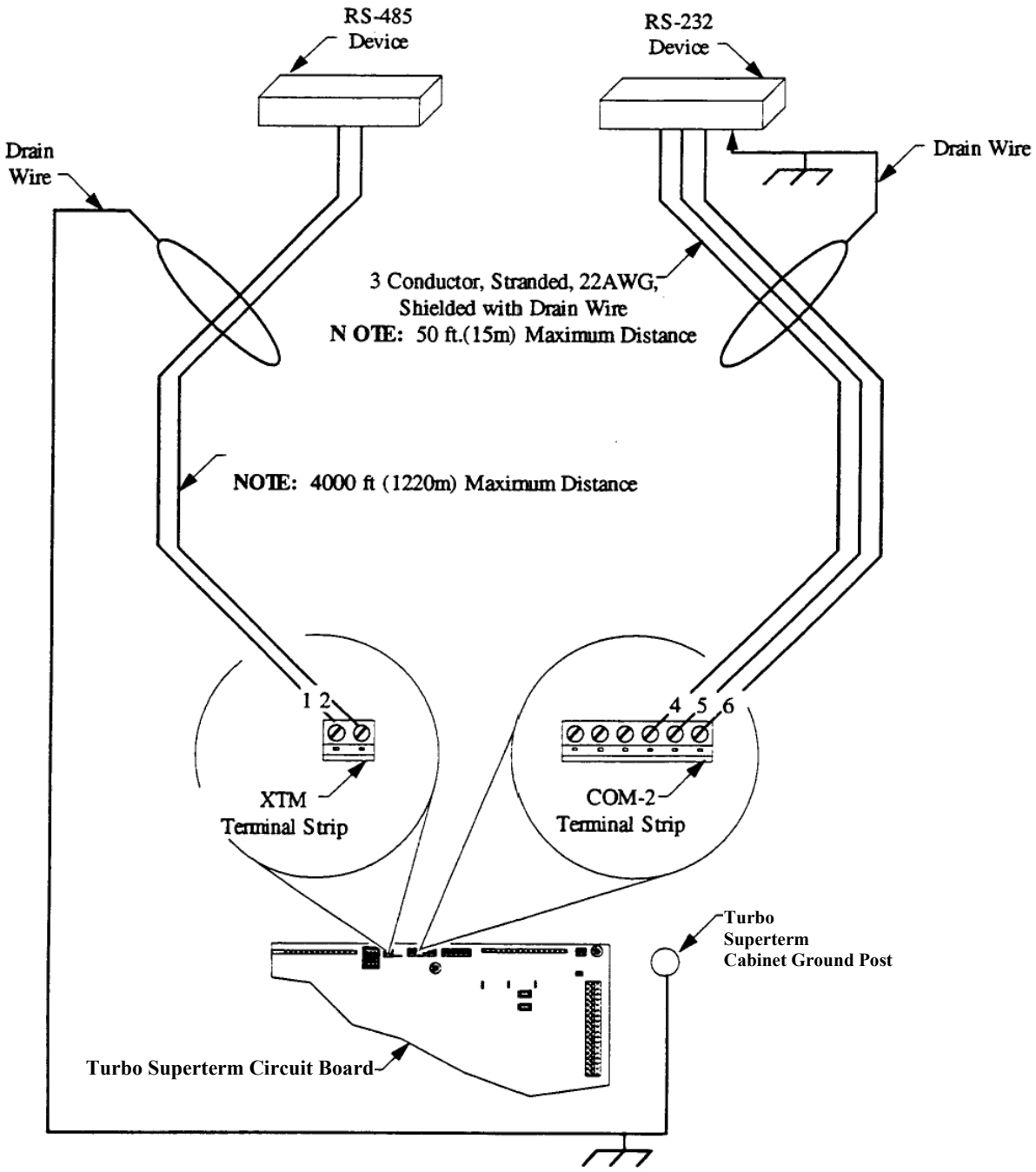


Figure 35 - Connecting Auxiliary RS-232 and RS-485 Devices to the Turbo Superterm

EXPANSION BOARD CONNECTIONS

Expansion Input/Output Boards

Expansion Input/Output (I/O) boards are used with the Turbo Superterm to increase the input and output capacity of the system. Expansion I/O boards include a Supervised Alarm board and a Digital Input/Digital Output (DI/DO) board.

- Supervised Alarm boards have 16 Supervised alarm inputs.
- DI/DO boards have 8 non-supervised alarm inputs and 16 relay outputs.

A maximum of three boards may be added to the Turbo Superterm. These boards mount to the inside door of the Turbo Superterm cabinet (see Figure 36).

NOTE: Refer to page 10, Configuration, for allowed Expansion Board combinations.

Expansion Board Connections

Expansion boards require the following cables and wires:

- Power wires between the Expansion boards and the Turbo Superterm main circuit board
- Data/Control ribbon cable between Expansion boards and the Turbo Superterm main circuit board
- I/O cables between Expansion boards and accessories

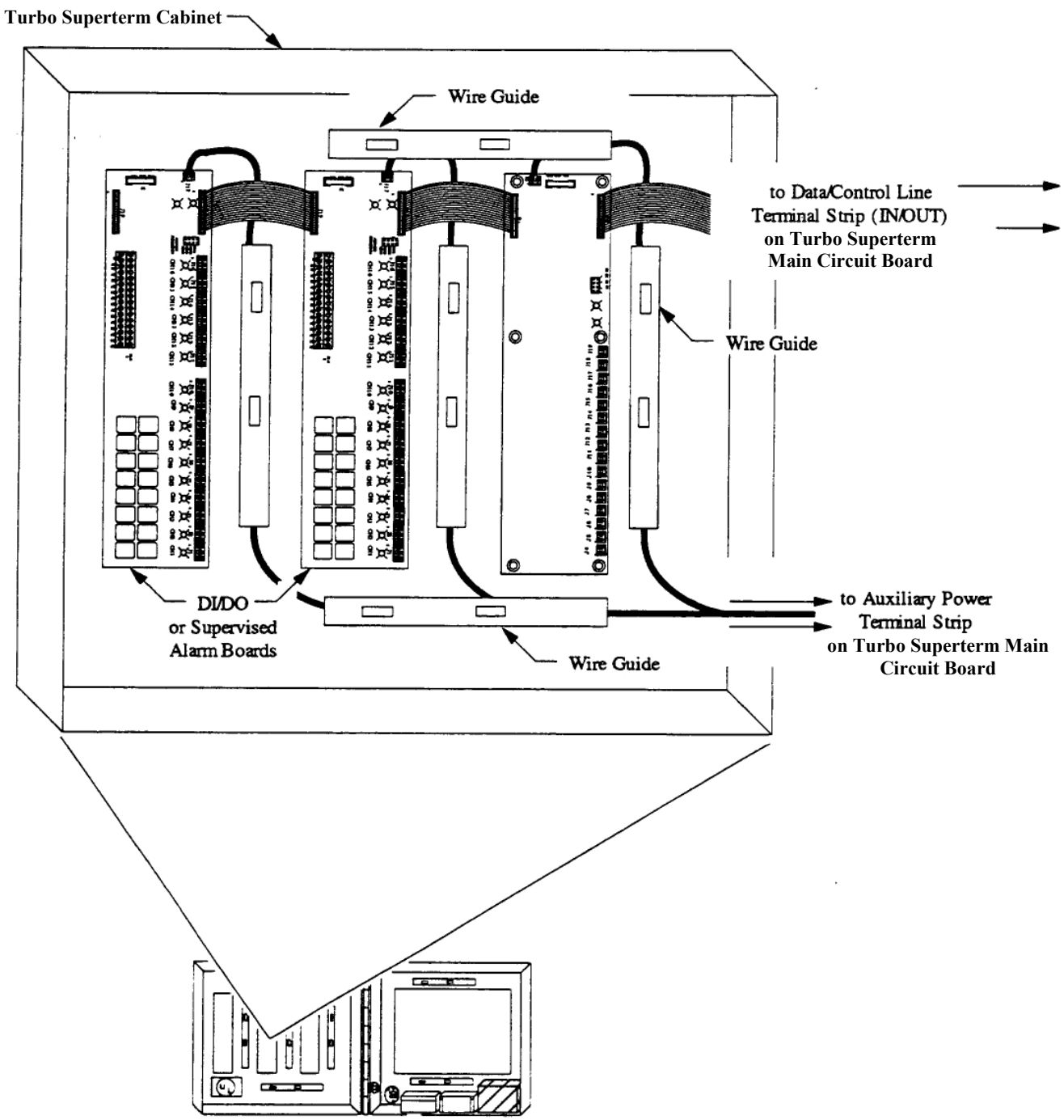


Figure 36 - Expansion Input/Output Board Layout in Turbo Superterm Cabinet

Supervised Alarm Board Installation

Supervised Alarm boards mount to any one of the three Expansion I/O board slots located on the side panel of the Turbo Superterm cabinet. The Supervised Alarm board is secured to the Turbo Superterm cabinet with three 6-32 screws (see Figure 37). The Supervised Alarm board receives addition mounting support from three snap standoffs affixed to the Turbo Superterm cabinet.

Supervised Alarm Board Power Connection

The Supervised Alarm board requires +12VDC for proper operation. Power for the Supervised Alarm board is supplied from the Auxiliary Power terminal strip located on the Turbo Superterm main circuit board (see Figure 38).
NOTE: Route all cables between the Expansion I/O boards and the Turbo Superterm circuit board through the wire guides provided on the Turbo Superterm cabinet.

The Auxiliary Power terminal strip provides three sets of +12VDC connections for use with Expansion I/O boards.

Table 40 lists the connections between the Supervised Alarm board and the Auxiliary Power terminal strip.

Table 40 - Supervised Alarm Board Connection Table

Supervised Alarm Board Connector/Pin #	Function	Auxiliary Power Terminal Strip Pin #
J2 - 1	+12VDC	1, 3, or 5
J2 - 2	GND	2, 4, or 6

Supervised Alarm Board Power Cable Requirements

The Supervised Alarm board requires 18AWG stranded wire between the Input Power terminal strip (labeled J2) and the Auxiliary Power terminal strip on the Turbo Superterm main circuit board.

Data/Control Line Ribbon Cable Connections

The Supervised Alarm board communicates with the Turbo Superterm through a 34-pin ribbon cable. The Supervised Alarm board contains two identical 34-pin connectors (labeled P1 and P2).

The 34-pin connector labeled P1 is used for daisy-chaining other Expansion I/O boards to the Supervised Alarm board (see Figure 37).

The 34-pin connector labeled P2 is used for connecting the Supervised Alarm board to other Expansion I/O boards (through daisy-chaining) or for connecting to the main circuit board of the Turbo Superterm.

NOTE: Pin 1 on the ribbon cable is indicated by a red wire and a notch (arrow) on the connector header. The ribbon cables must be installed with proper Pin 1 alignment.

All Expansion I/O boards mounted on the Turbo Superterm cabinet are joined with either 5-inch ribbon cables or 18-inch ribbon cables.

- The 5-inch ribbon cables are used for inter-connecting (daisy-chaining) the Expansion I/O boards mounted on the cabinet wall.
- The 18-inch ribbon cable is used to connect the innermost Expansion I/O board to the Turbo Superterm main circuit board at the Data/Control Line Input Terminal Strip.

Warning: The 18-inch ribbon cable should NOT be used to connect Expansion I\O boards together and should only be used to connect Expansion I\O to the Superterm main circuit board.

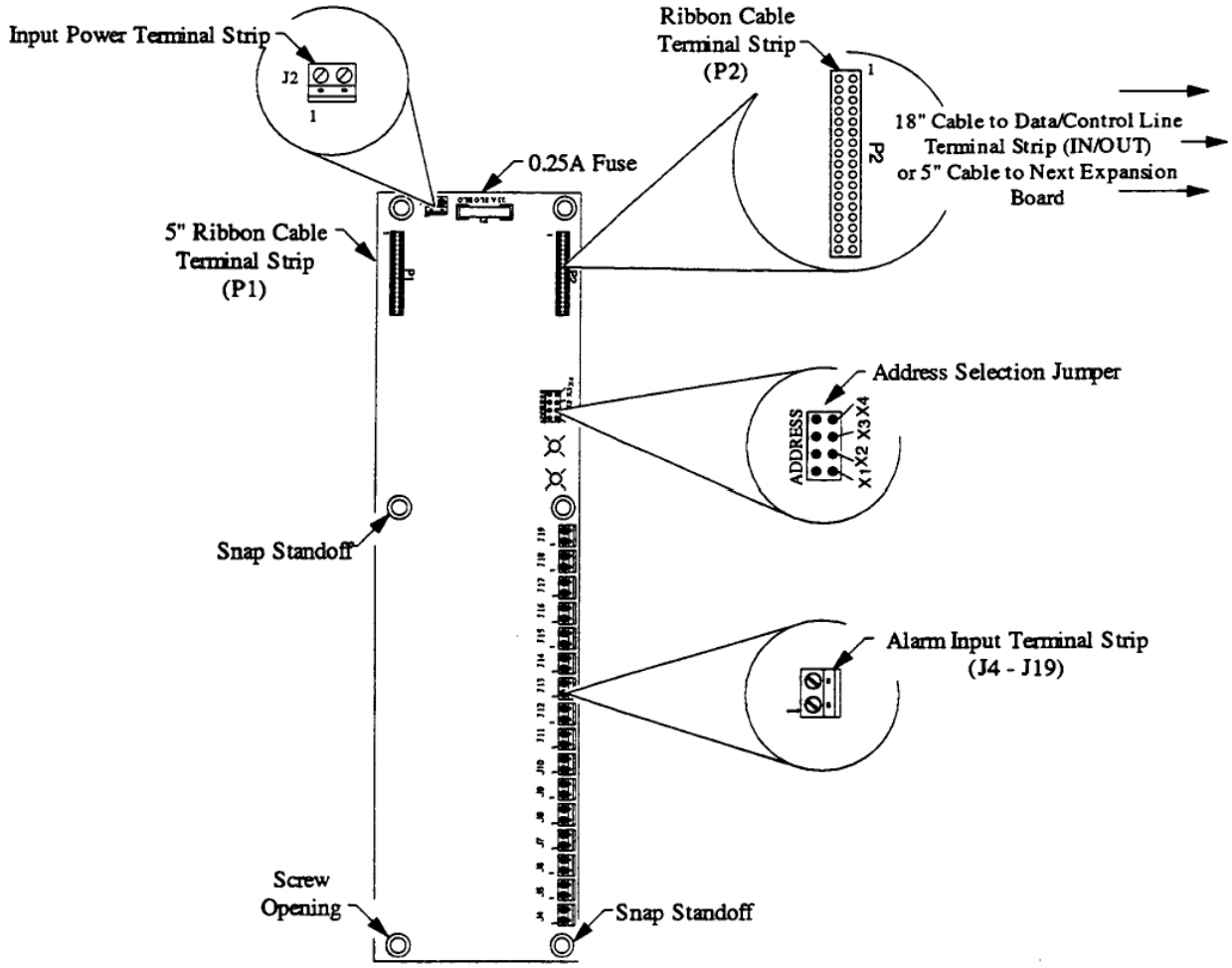


Figure 37 - Supervised Alarm Board Layout

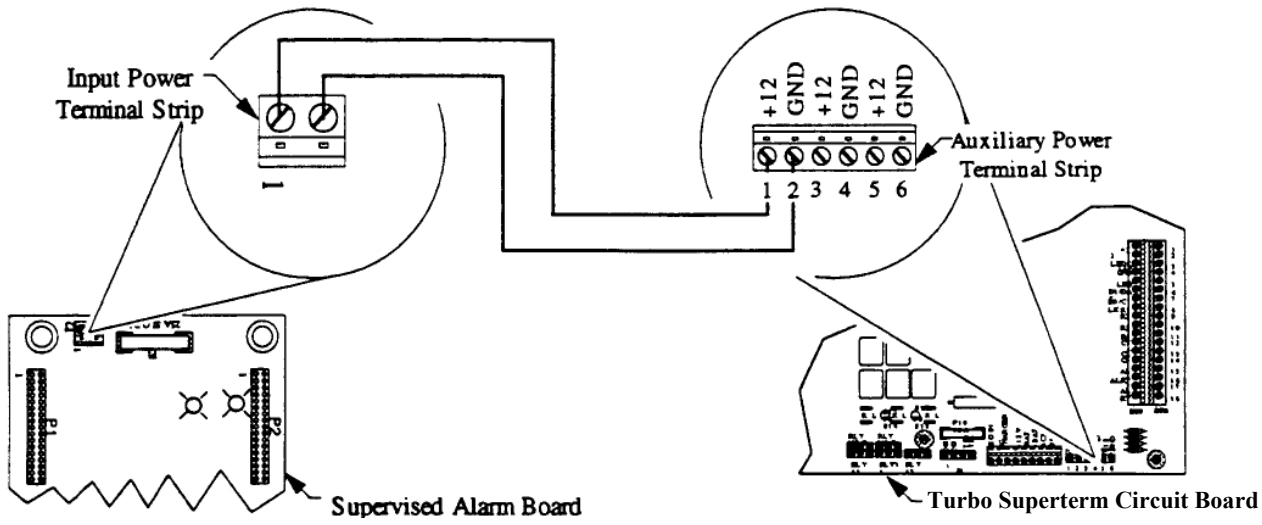


Figure 38 - Supervised Alarm Board-to-Turbo Superterm Power Connection

Supervised Alarm Board Accessory Connections

The Supervised Alarm board provides terminal strips for 16 alarm inputs. The alarm inputs are connected to the Supervised Alarm board using connectors J4 through J19 (see Figure 40).

NOTE: Route all cables between the Supervised Alarm boards and the accessory alarm inputs through the wire guides provided on the Turbo Superterm cabinet.

Table 41 lists the connections between the Supervised Alarm board and the alarm inputs.

Table 41 - Accessory Input Connection Table	
Supervised Alarm Board Connector J4-J19 Pin #	**Function**
1	Alarm Signal
2	Alarm Return

NOTE: Alarm connections are not sensitive to polarity.

CAUTION
A When powering-up the Turbo Superterm system, at least one of the supervised alarm inputs must be in a non-open condition. The Turbo Superterm will not be able to initialize the Supervised Alarm board if all of the inputs are open.

Supervised Alarm Cable Requirements

Alarm inputs require a 22AWG, 2-conductor, stranded, shielded cable with drain wire between the alarm sensor and the Supervised Alarm board. DO NOT use twisted pair cable.

Table 42 lists the cable gauge-vs-length requirements for proper operation of the Supervised Alarm board and the alarm sensor device.

Table 42 - Cable Requirements for Alarm Inputs		
Unit	Distance *(maximum)*	Wire Gauge
Supervised Alarm Input	500 ft/153m	22AWG Shielded w/drain

NOTE: All alarm input cables must be grounded. Refer to the section on Grounding Accessory Drain and Shield Wires, Page 15.

Supervised Alarm Board Address Selection Jumper

Proper operation of the Turbo Superterm and any Expansion I/O boards requires that each Expansion I/O board have a unique address.

The Supervised Alarm board has an on-board Address Selection jumper that identifies the board to the Turbo Superterm (see Figure 40).

Setting the Address Selection Jumper

The I/O signal definitions (numbers assigned to inputs and outputs) are determined by the Expansion I/O board address settings. Refer to the section on I/O Signal Mapping, page 68).

1) Install all of the Expansion I/O boards in the Turbo Superterm Cabinet before setting the Address Selection jumper.
2) Determine the location of the Expansion I/O board in the order, **from right to left**, that the Expansion I/O boards are mounted (see Figure 40).
3) Set the Supervised Alarm board Address Selection jumper accordingly.

NOTES: The Address Selection jumper has four possible positions, X1, X2, X3, and X4. Position X4 is reserved for future use.

Do NOT use position X4 when setting the Address Selection jumper.

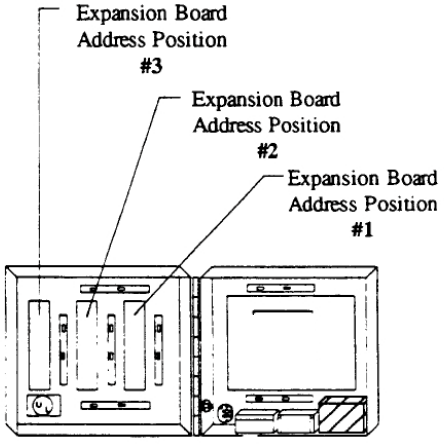


Figure 39 - Expansion Board Address Positions

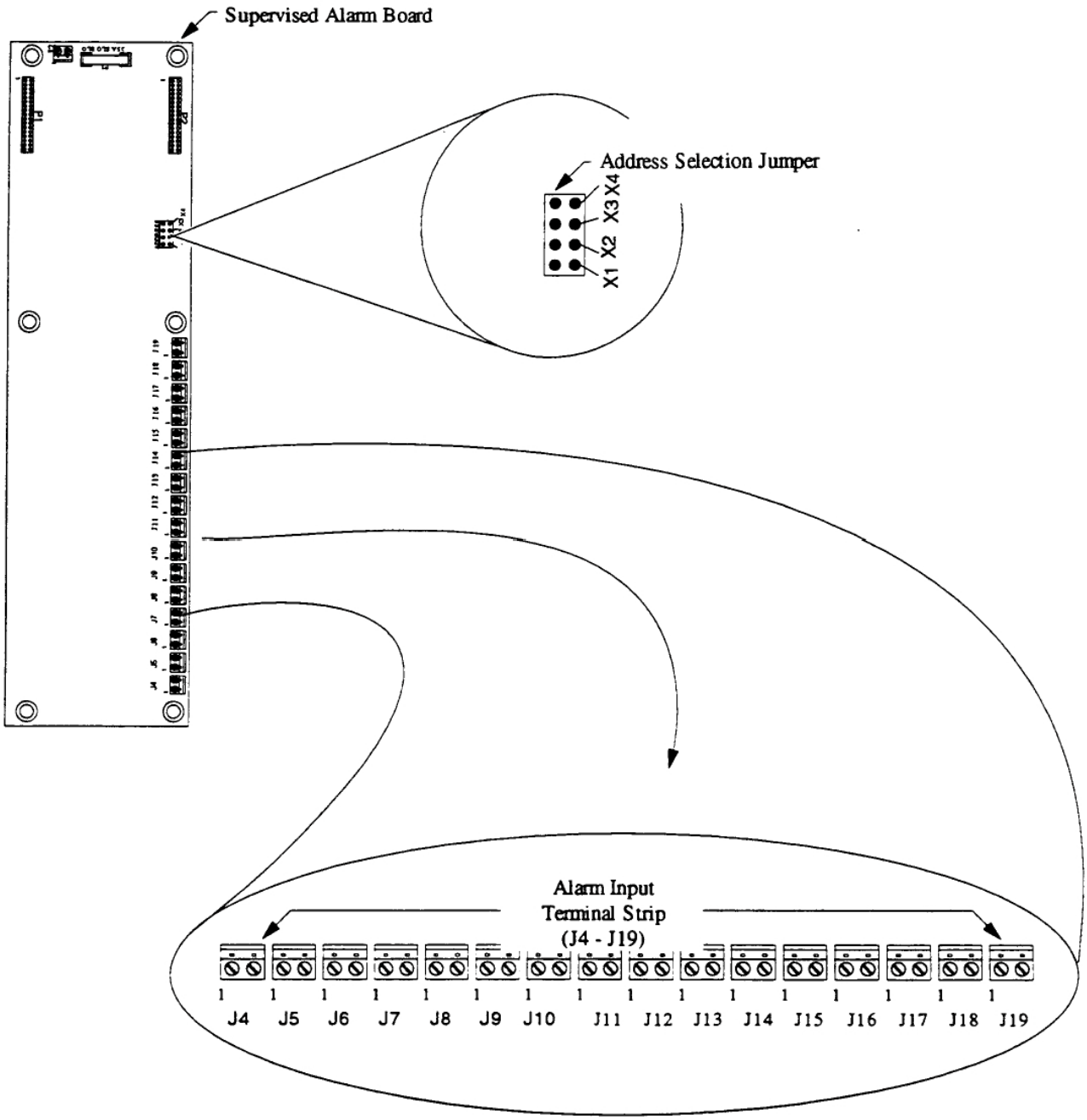

Supervised Alarm Board
Address Selection Jumper
X1 X2 X3 X4
Alarm Input
Terminal Strip
(J4 - J19)
J4 J5 J6 J7 J8 J9 J10 J11 J12 J13 J14 J15 J16 J17 J18 J19

Figure 40 - Supervised Alarm Board Alarm Input Connections and Address Settings

DI/DO Board Connection

DI/DO boards mount to any one of the three Expansion I/O board slots located on the side panel of the Turbo Superterm cabinet. The DI/DO board is secured to the Turbo Superterm cabinet with three 6-32 screws (see Figure 41). The DI/DO board receives addition mounting support from three snap standoffs affixed to the Turbo Superterm cabinet.

DI/DO Board Power Connection

The DI/DO board requires +12VDC for proper operation. Power for the DI/DO board is supplied from the Auxiliary Power terminal strip located on the Turbo Superterm main circuit board (see Figure 42).
NOTE: Route all cables between the Expansion I/O boards and the Turbo Superterm circuit board through the wire guides provided on the Turbo Superterm cabinet.

The Auxiliary Power terminal strip provides three sets of +12VDC connections for use with DI/DO boards.

Table 43 lists the connections between the DI/DO board and the Auxiliary Power terminal strip.

Table 43 - DI/DO Board Connection Table

DI/DO Board	Function	Auxiliary Power
Connector - Pin #		Terminal Strip Pin #
J2 - 1	+12VDC	1, 3, or 5
J2 - 2	GND	2, 4, or 6

DI/DO Board Power Cable Requirements

The DI/DO board requires 18AWG stranded wire between the Input Power terminal strip (labeled J2) and the Auxiliary Power terminal strip on the Turbo Superterm main circuit board.

Data/Control Line Ribbon Cable Connections

The DI/DO board communicates with the Turbo Superterm through a 34-pin ribbon cable. The DI/DO board contains two identical 34-pin connectors (labeled J 18 and J 19).

The 34-pin connector labeled J19 is used for daisy-chaining other Expansion I/O boards to the DI/DO board (see Figure 41).

The 34-pin connector labeled J18 is used for connecting the DI/DO board to other Expansion I/O boards (through daisy-chaining) or for connecting to the main circuit board of the Turbo Superterm.

NOTE: Pin 1 on the ribbon cable is indicated by a red wire and a notch (arrow) on the connector header. The ribbon cables must be installed with proper Pin 1 alignment.

All Expansion I/O boards mounted on the Turbo Superterm cabinet are joined with either 5-inch ribbon cables or 18-inch ribbon cables.

The 5-inch ribbon cables are used for inter-connecting (daisy-chaining) the Expansion I/O boards mounted on the cabinet wall.

The 18-inch ribbon cable is used to connect the innermost Expansion I/O board to the Turbo Superterm main circuit board at the Data/Control Line Input Terminal Strip.

Warning: The 18-inch ribbon cable should NOT be used to connect Expansion I\O boards together and should only be used to connect Expansion I\O to the Superterm main circuit board.

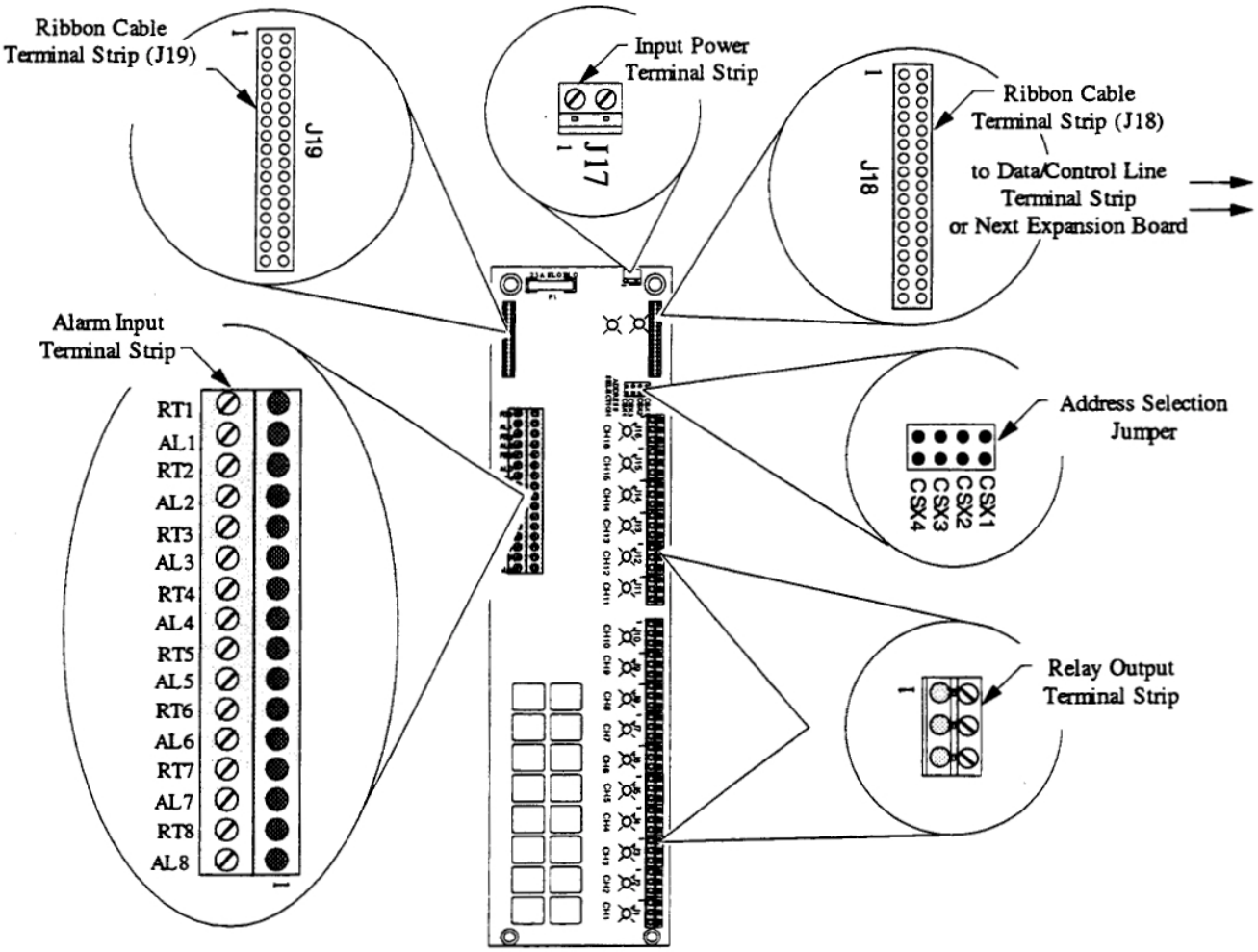


Figure 41 - DI/DO Board Layout

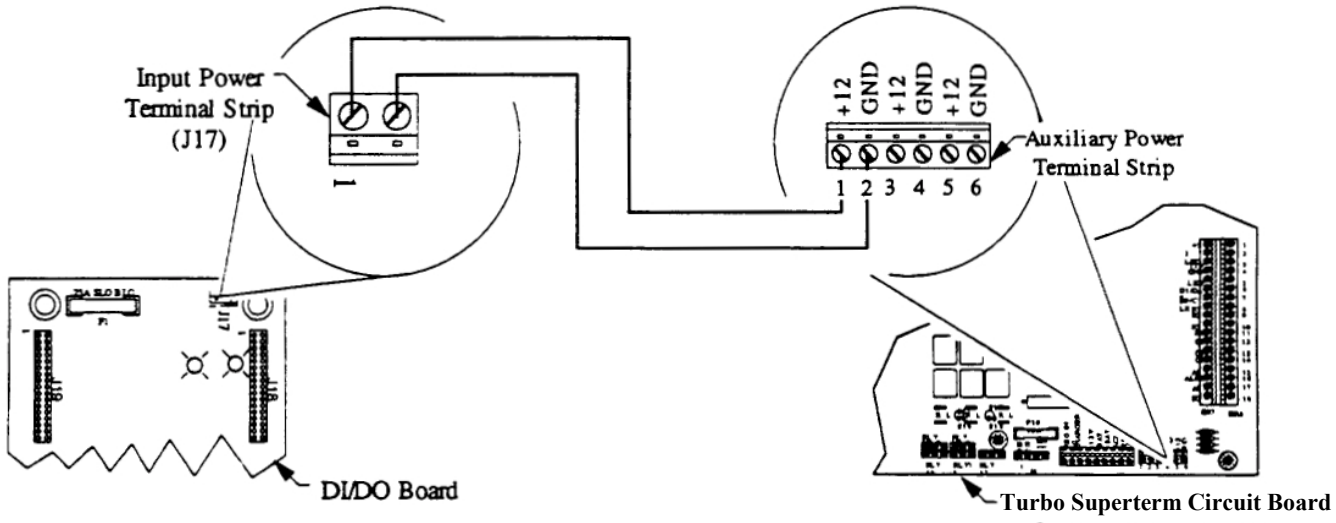


Figure 42 - DI/DO Board -to- Turbo Superterm Power Connection

DI/DO Alarm Input Connections

The DI/DO board provides eight non-supervised alarm inputs (see Figure 43).

The eight non-supervised alarm inputs are connected to the DI/DO board through the Alarm Input terminal strip.

Table 44 lists the connections to the Alarm Input terminal strip and the appropriate functions of each connection.

Table 44 - Alarm Input Terminal Strip Connection Table

Alarm Input Terminal Strip	
Pin #	**Function**
1	Alarm 8 Signal
2	Alarm 8 Return
3	Alarm 7 Signal
4	Alarm 7 Return
5	Alarm 6 Signal
6	Alarm 6 Return
7	Alarm 5 Signal
8	Alarm 5 Return
9	Alarm 4 Signal
10	Alarm 4 Return
11	Alarm 3 Signal
12	Alarm 3 Return
13	Alarm 2 Signal
14	Alarm 2 Return
15	Alarm 1 Signal
16	Alarm 1 Return

DI/DO Alarm Cable Requirements

Alarm inputs require 22AWG, 2-conductor, stranded, shielded cable with drain wire. DO NOT use twisted pair cables.

NOTES: Route all cables between the Expansion I/O boards and the Turbo Superterm circuit board through the wire guides provided on the Turbo Superterm cabinet.

Cable length between the DI/DO board and an alarm device is limited to a maximum of 500 ft (153m).

Table 45 lists the cable gauge-vs-length requirements for proper operation of the DI/DO board and the alarm device.

Table 45 -- Cable Requirements for Alarm Inputs

Unit	Distance (maximum)	Wire Gauge
Alarm Device	500ft/153m	22AWG Shielded w/ drain

NOTE: All alarm input cables must be grounded. Refer to the Grounding Accessory Drain and Shield Wire section, Page 15.

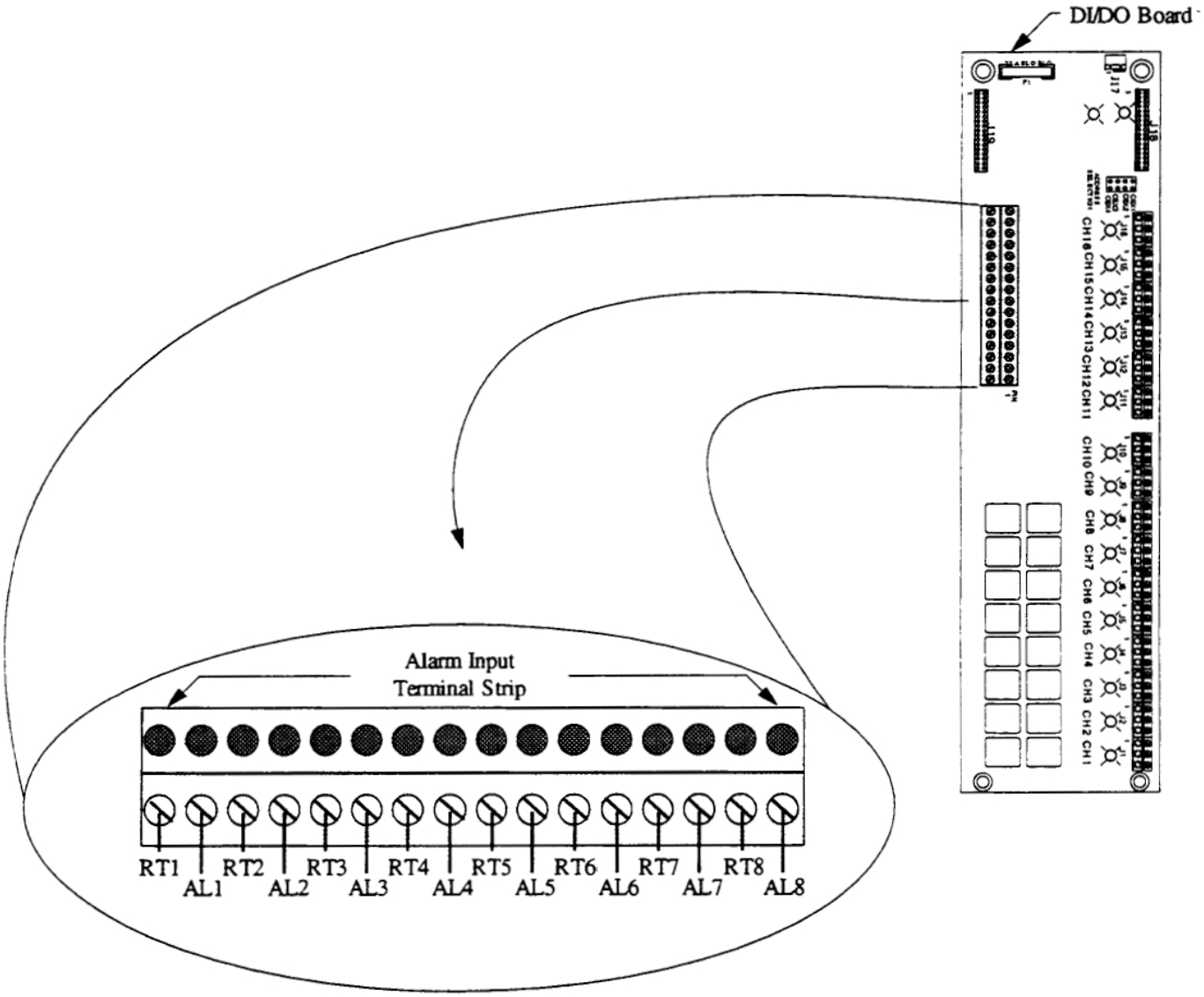


Figure 43 - DI/DO Board Alarm Input Terminal Strip

DI/DO Alarm Output Connections

The DI/DO board incorporates 16 relays (K1 through K16) that provide 16 "Form C" contact sets. Connections to these relays are made through the Alarm Output terminal strips labeled J 1 through J 16 (see Figure 45).

Each contact set consists of a normally open (NO), a common (C), and a normally closed (NC) connection point.
Where Jxx is to be interpreted as J1-J16,

- Jxx-1 = Normally Closed
- Jxx-2 = Common
- Jxx-3 = Normally Open

NOTE: The contact rating is 3 Amperes (resistive).

In order to reduce electrical noise generated by controlled devices such as electric door strikes or magnetic locks, a Metal-Oxide-Varistor (MOV) has been placed across each of the relay contact sets.

NOTE: These MOVs have a voltage rating of 56 Volts DC.

Maximum efficiency of the Turbo Superterm requires installing additional MOVs across each door strike or magnetic lock, as close to the device as is possible.

NOTE: Additional MOVs are available from Continental Instruments as part number, *Rv0005*.

CAUTION
Door strike wiring must not be placed in the cables, bundles, or conduit with other wiring. Transients produced by these wires may cause unreliable operation of the Turbo Superterm. Maintain a minimum of six inches distance between door strike wiring and all other input wiring.

DI/DO Alarm Board Address Selection Jumper

Proper operation of the Turbo Superterm and any Expansion I/O boards requires that each Expansion I/O board have a unique address.

The DI/DO Alarm board has an on-board Address Selection jumper that identifies the board to the Turbo Superterm (see Figure 45).

Setting the Address Selection Jumper

1. Install all of the Expansion I/O boards in the Turbo Superterm Cabinet before setting the Address Selection jumper.

2. Determine the location of the DI/DO Alarm board in the order, *from right to left*, that the Expansion I/O boards are mounted (see Figure 44).

3. Set the DI/DO Alarm board Address Selection jumper accordingly.

NOTE: The Address Selection jumper has four possible positions, Xl, X2, X3, and *X4*. Position X4 is reserved for future use.

Do NOT use position *X4* when setting the Address Selection jumper.

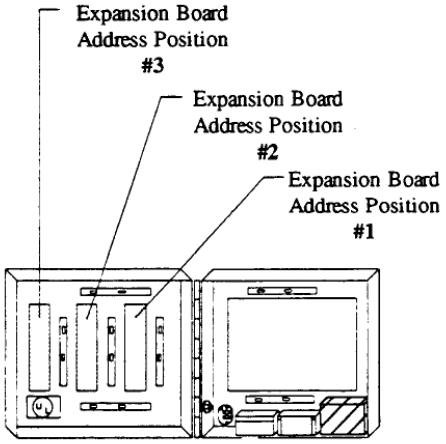


Figure 44 - Expansion Board Address Positions

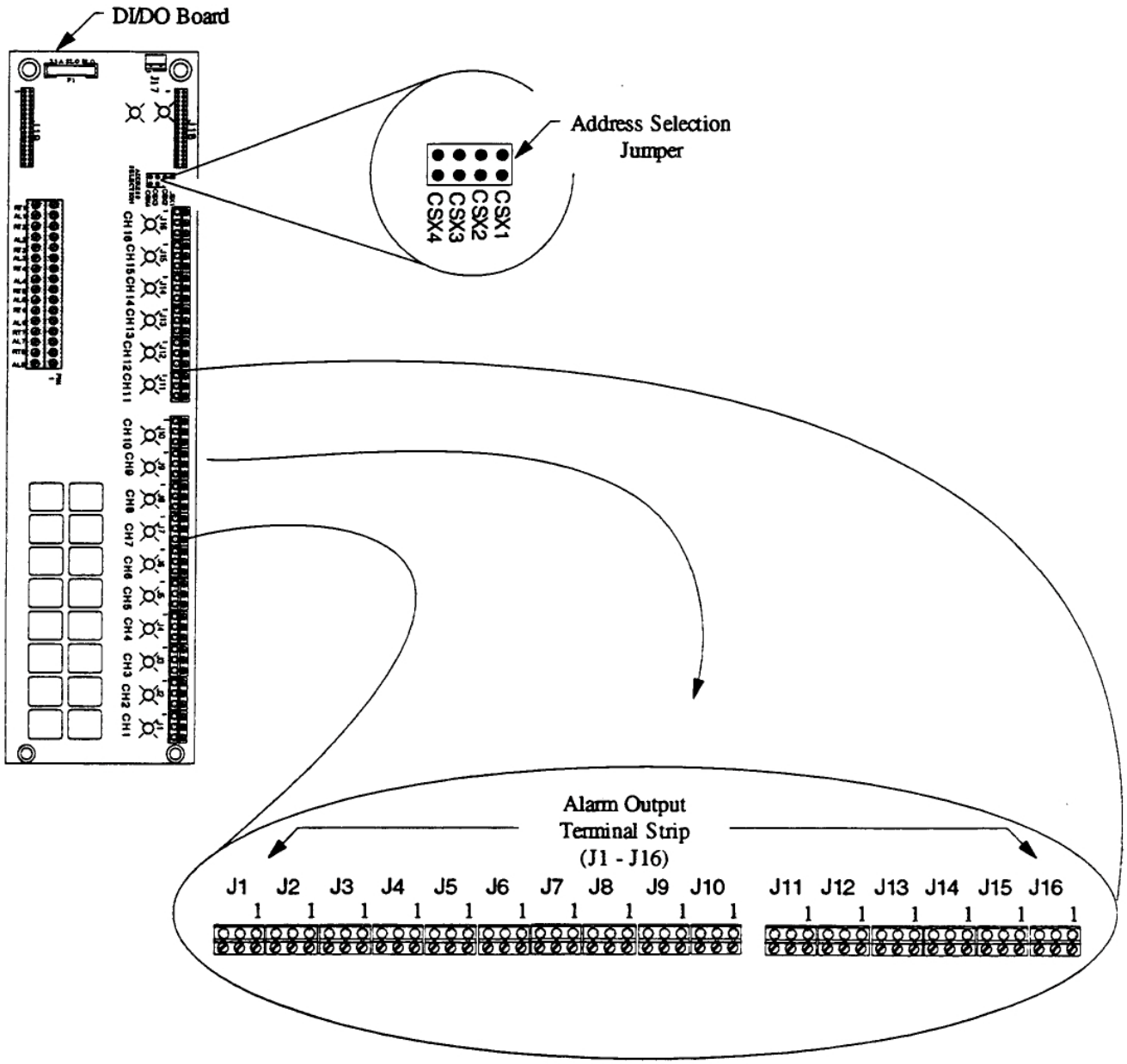


Figure 45 - DI/DO Board Relay Output Connections and Address Setting

I/O SIGNAL MAPPING

The alarm inputs and relay outputs for the Turbo Superterm board and for Expansion I/O boards are assigned specific numbers for use when programming and displaying signals with a host computer.

Turbo Superterm Main Circuit Board: 8-Reader Version

The 8-Reader version has 25 alarm inputs and 17 relay outputs. Table 46 defines the terminal strip, the associated pin number, the associated signal, and the associated input/output number.

Table 46 - 8-Reader I/O Signal Definition

INPUTS				OUTPUTS			
Connector	**Pin #**	**Signal**	**Input #**	**Connector**	**Pin #**	**Signal**	**Output #**
DR1	15,16	Door 1 Sensor	1	RLY_1	1, 2, 3	Door Strike 1	1
DR1	17,18	Door 1 Bypass	2	RLY_2	1, 2, 3	Door Shunt 1	2
DR2	15,16	Door 2 Sensor	3	RLY_3	1, 2, 3	Door Strike 2	3
DR2	17,18	Door 2 Bypass	4	RLY_4	1, 2, 3	Door Shunt 2	4
DR3	15,16	Door 3 Sensor	5	RLY_5	1, 2, 3	Door Strike 3	5
DR3	17,18	Door 3 Bypass	6	RLY_6	1, 2, 3	Door Shunt 3	6
DR4	15,16	Door 4 Sensor	7	RLY_7	1, 2, 3	Door Strike 4	7
DR4	17,18	Door 4 Bypass	8	RLY_8	1, 2, 3	Door Shunt 4	8
DR5	15,16	Door 5 Sensor	9	RLY_9	1, 2, 3	Door Strike 5	9
DR5	17,18	Door 5 Bypass	10	RLY_10	1, 2, 3	Door Shunt 5	10
DR6	15,16	Door 6 Sensor	11	RLY_11	1, 2, 3	Door Strike 6	11
DR6	17,18	Door 6 Bypass	12	RLY_12	1, 2, 3	Door Shunt 6	12
DR7	15,16	Door 7 Sensor	13	RLY_13	1, 2, 3	Door Strike 7	13
DR7	17,18	Door 7 Bypass	14	RLY_14	1, 2, 3	Door Shunt 7	14
DR8	15,16	Door 8 Sensor	15	RLY_15	1, 2, 3	Door Strike 8	15
DR8	17,18	Door 8 Bypass	16	RLY_16	1, 2, 3	Door Shunt 8	16
Alarm	1,2	Aux Alarm 17	17				
Alarm	3,4	Aux Alarm 18	18				
Alarm	5,6	Aux Alarm 19	19				
Alarm	7,8	Aux Alarm 20	20				
Alarm	9,10	Aux Alarm 21	21				
Alarm	11,12	Aux Alarm 22	22				
Alarm	13,14	Aux Alarm 23	23				
Alarm	15,16	Aux Alarm 24	24				
Tampr1	1,2	Tamper	81	RLY_17	1, 2, 3	Console Relay	73

Turbo Superterm Main Circuit Board:
4-Reader Version

The 4-Reader version has 17 alarm inputs and 9 relay outputs. Table 47 defines the terminal strip, the associated pin number, the associated signal, and the associated input/output number.

Table 47 - 4-Reader I/O Signal Definition

INPUTS				OUTPUTS			
Connector	**Pin #**	**Signal**	**Input #**	**Connector**	**Pin #**	**Signal**	**Output #**
DR1	15,16	Door 1 Sensor	1	RLY_1	1, 2, 3	Door Strike 1	1
DR1	17,18	Door 1 Bypass	2	RLY_2	1, 2, 3	Door Shunt 1	2
DR2	15,16	Door 2 Sensor	3	RLY_3	1, 2, 3	Door Strike 2	3
DR2	17,18	Door 2 Bypass	4	RLY_4	1, 2, 3	Door Shunt 2	4
DR3	15,16	Door 3 Sensor	5	RLY_5	1, 2, 3	Door Strike 3	5
DR3	17,18	Door 3 Bypass	6	RLY_6	1, 2, 3	Door Shunt 3	6
DR4	15,16	Door 4 Sensor	7	RLY_7	1, 2, 3	Door Strike 4	7
DR4	17,18	Door 4 Bypass	8	RLY_8	1, 2, 3	Door Shunt 4	8
Alarm	1,2	Aux Alarm 9	9				
Alarm	3,4	Aux Alarm 10	10				
Alarm	5,6	Aux Alarm 11	11				
Alarm	7,8	Aux Alarm 12	12				
Alarm	9,10	Aux Alarm 13	13				
Alarm	11,12	Aux Alarm 14	14				
Alarm	13,14	Aux Alarm 15	15				
Alarm	15,16	Aux Alarm 16	16				
Tampr1	1,2	Tamper	81	RLY_17	1, 2, 3	Console Relay	73

Expansion I/O Boards

The Expansion I/0 Boards will have different I/O signal number assignments depending on the board address setting.

DI/DO Board

The DI/DO board has 8 alarm inputs and 16 relay outputs. Table 48 defines the terminal strip, the associated pin number, the associated signal, and the associated input/output number.

Table 48 - DI/DO Board I/O Signal Definition--INPUTS

			4-Door Turbo Superterm			8-Door Turbo Superterm		
			CSX1	CSX2	CSX3	CSX1	CSX2	CSX3
Connector	Pin #	Signal	Input #	Input #	Input #	Input #	Input #	Input #
J20	15,16	AL1, RT1	17	33	49	25	41	57
J20	13,14	AL2, R12	18	34	50	26	42	58
J20	11,12	AL3, RT3	19	35	51	27	43	59
J20	9,10	AL4, RT4	20	36	52	28	44	60
J20	7,8	AL5, RT5	21	37	53	29	45	61
J20	5,6	AL6, RT6	22	38	54	30	46	62
J20	3,4	AL7, RT7	23	39	55	31	47	63
J20	1,2	AL8, RT8	24	40	56	32	48	64

Table 48 - DI/DO Board I/O Signal Definition--OUTPUTS

			8-Door Turbo Superterm		
Connector	Pin #	Signal	CSX1 Output#	CSX2 Output#	CSX3 Output#
J1	1, 2, 3	CH1	17	33	49
J2	1, 2, 3	CH2	18	34	50
J3	1, 2, 3	CH3	19	35	51
J4	1, 2, 3	CH4	20	36	52
J5	1, 2, 3	CH5	21	37	53
J6	1, 2, 3	CH6	22	38	54
J7	1, 2, 3	CH7	23	39	55
J8	1, 2, 3	CH8	24	40	56
J9	1, 2, 3	CH9	25	41	57
J10	1, 2, 3	CH10	26	42	58
J11	1, 2, 3	CH11	27	43	59
J12	1, 2, 3	CH12	28	44	60
J13	1, 2, 3	CH13	29	45	61
J14	1, 2, 3	CH14	30	46	62
J15	1, 2, 3	CH15	31	47	63
J16	1, 2, 3	CH16	32	48	64

Table 48a - 4 Door Superterm

CSX1 Output #	CSX2 Output#	CSX3 Output #
9	25	41
10	26	42
11	27	43
12	28	44
13	29	45
14	30	46
15	31	47
16	32	48
17	33	49
18	34	50
19	35	51
20	36	52
21	37	53
22	38	54
23	39	55
24	40	56

***NOTE:** Relay outputs are limited to a maximum of 72 (73 is reserved for the console relay).
NOTE: Enclosure can only accommodate 3 expansion boards.

Supervised Alarm Board

The Supervised Alarm board has 16 alarm inputs. Table 49 defines the terminal strip, the associated pin number, the associated signal, and the associated input/output number.

Table 49 - Supervised Alarm Board I/O Signal Definition

			INPUTS					
			4-Door Superterm			8-Door Superterm		
Connector	Pin #	Signal	X1 Input #	X2 Input #	X3 Input #	X1 Input #	X2 Input #	X3 Input #
J4	1, 2	AL1, RT1	17	33	49	25	41	57
J5	1, 2	AL2, RT2	18	34	50	26	42	58
J6	1, 2	AL3, RT3	19	35	51	27	43	59
J7	1, 2	AL4, RT4	20	36	52	28	44	60
J8	1, 2	AL5, RT5	21	37	53	29	45	61
J9	1, 2	AL6, RT6	22	38	54	30	46	62
J10	1, 2	AL7, RT7	23	39	55	31	47	63
J11	1, 2	AL8, RT8	24	40	56	32	48	64
J12	1, 2	AL9, RT9	25	41	57	33	49	65
J13	1, 2	AL10, RT10	26	42	58	34	50	66
J14	1, 2	AL11, RT11	27	43	59	35	51	67
J15	1, 2	AL12, RT12	28	44	60	36	52	68
J16	1, 2	AL13, RT13	29	45	61	37	53	69
J17	1, 2	AL14, RT14	30	46	62	38	54	70
J18	1, 2	AL15, RT15	31	47	63	39	55	71
J19	1, 2	AL16, RT16	32	48	64	40	56	72

*** NOTE:** Inputs are limited to a maximum of 80 (81 is reserved for the tamper switch).
NOTE: Enclosure can only accommodate 3 expansion boards.

SETTINGS

Jumper Settings

The Turbo Superterm circuit board functions with a variety of options. Proper circuit operation requires setting specific jumpers depending on the installed access control accessories, the installed system options, and any network configurations.

232-1 Jumper

The 232-1 jumper enables either the RS-232 communication lines connected to the COM2 terminal strip or the RS-485 communication lines connected to the XTM terminal strip.

COM2 Enabled
The COM2 port is enabled when the Turbo Superterm uses RS-232 communications protocol. Connections to the external device are made through the COM2 terminal strip.

- Set the jumper to contact the center post (pin 2) and the lefthand post (pin 1) (see Figure 46).

XTM Enabled
The XTM port is enabled when the Turbo Superterm uses RS-485 communications protocol. Connections to the external device are made through the XTM terminal strip.

- Set the jumper to contact the center post (pin 2) and the right-hand post (pin 3).

EOL1 Jumper

When using the RS-485 communication protocol to network multiple Turbo Superterm units through the POLL terminal strip, the EOL1 jumper on the LAST unit in the communication network must be set to the TERMINATED position.

Turbo Superterm *TERMINATED*
Set the jumper to contact the center post (pin 2) and the lefthand post (pin 1) (see Figure 46).

Turbo Superterm *NOT TERMINATED*
Set the jumper to contacting the center post (pin 2) and the right-hand post (pin 3).

EOL2 Jumper

When operating multiple Turbo Superterm units in a MULTIDROP RS-422 network, the EOL2 jumper on the LAST unit in the communication network must be set to the TERMINATED position.

NOTE: When operating multiple Turbo Superterm units in a REPEAT RS-422 network, the EOL2 jumper on *every* Turbo Superterm unit must be set to the TERMINATED position.

Turbo Superterm *TERMINATED*
Set the jumper to contact the center post (pin 2) and the lefthand post (pin 1) (see Figure 46).

Turbo Superterm *NOT TERMINATED*
Set the jumper to contact the center post (pin 2) and the right-hand post (pin 3).

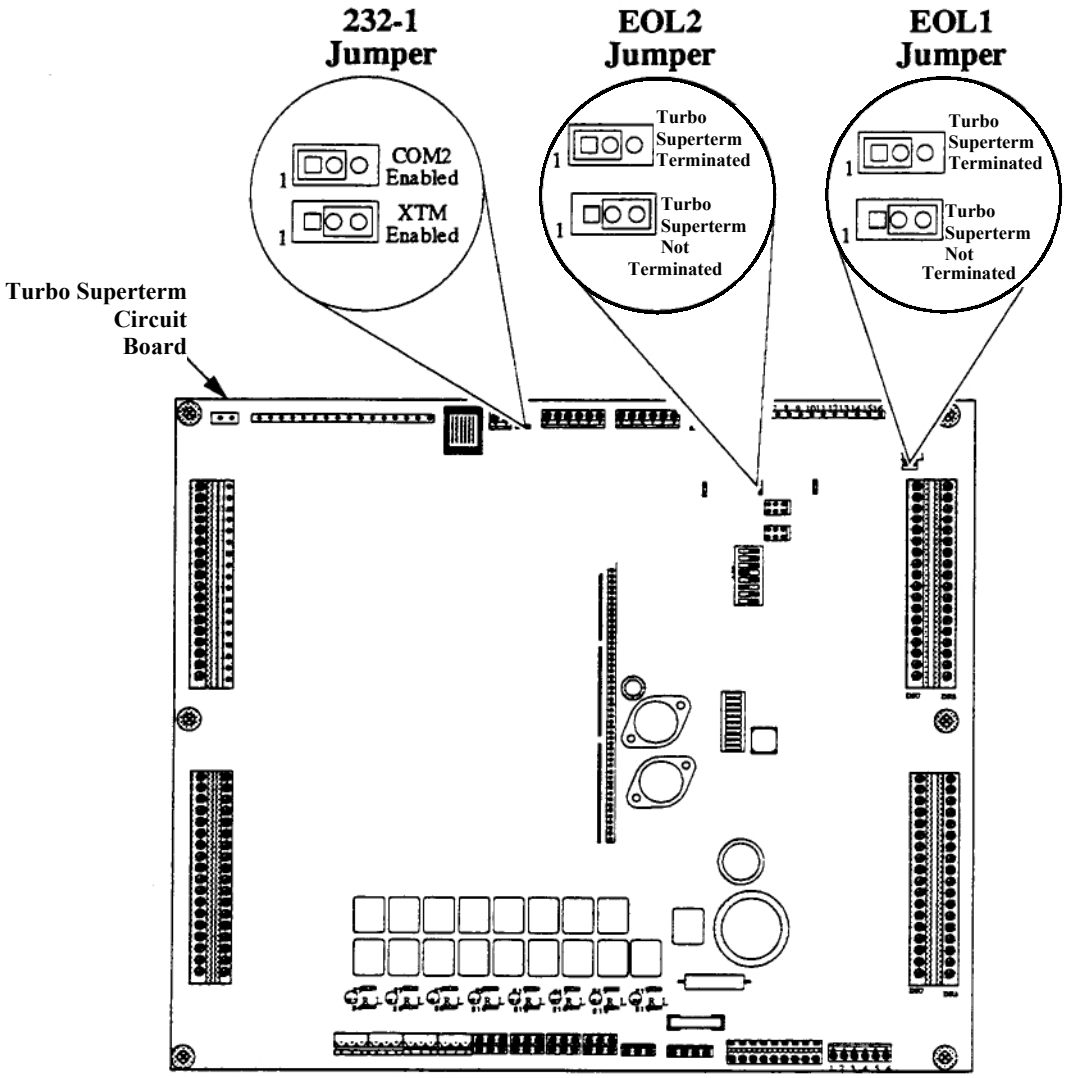


Figure 46 - 232-1, EOL1, and EOL2 Jumper Locations and Settings

COM1 Jumper

The COM1 jumper establishes the communication baud rates between the Turbo Superterm and external devices using the COM-1 terminal strip.

The available COM1 baud rate selections are:	
1200Kbps	Pins 7 and 8
2400Kbps	Pins 5 and 6
4800Kbps	Pins 3 and 4
9600Kbps	Pins 1 and 2

Determine the optimal communication rate between the Turbo Superterm and the peripheral communication device.

- Set the COM1 jumper to contact the two posts adjacent to the desired baud rate (see Figure 47).

COM2 Jumper

The COM2 jumper establishes the communication baud rates between the Turbo Superterm and external devices using the COM-2 input terminal strip.

The available COM2 baud rate selections are:	
1200Kbps	Pins 7 and 8
2400Kbps	Pins 5 and 6
4800Kbps	Pins 3 and 4
9600Kbps	Pins 1 and 2

Determine the optimal communication rate between the Turbo Superterm and the peripheral communication device.
Set the COM2 jumper to contact the two posts adjacent to the desired baud rate (see Figure 47).

MONITOR Jumper

The Turbo Superterm has the capability to output programming data to a dedicated monitor.

Hookup Monitor

Use the *Hookup* Monitor mode when a dedicated monitor is connected to the Turbo Superterm.

- Set the jumper to contact the center post (pin 2) and the lefthand post (pin 1) (see Figure 47).

Do Not Hookup Monitor

Use the Do Not *Hookup* Monitor mode when no monitor is connected to the Turbo Superterm.

- Set the jumper to contact the center post (pin 2) and the right-hand post (pin 3) (see Figure 47).

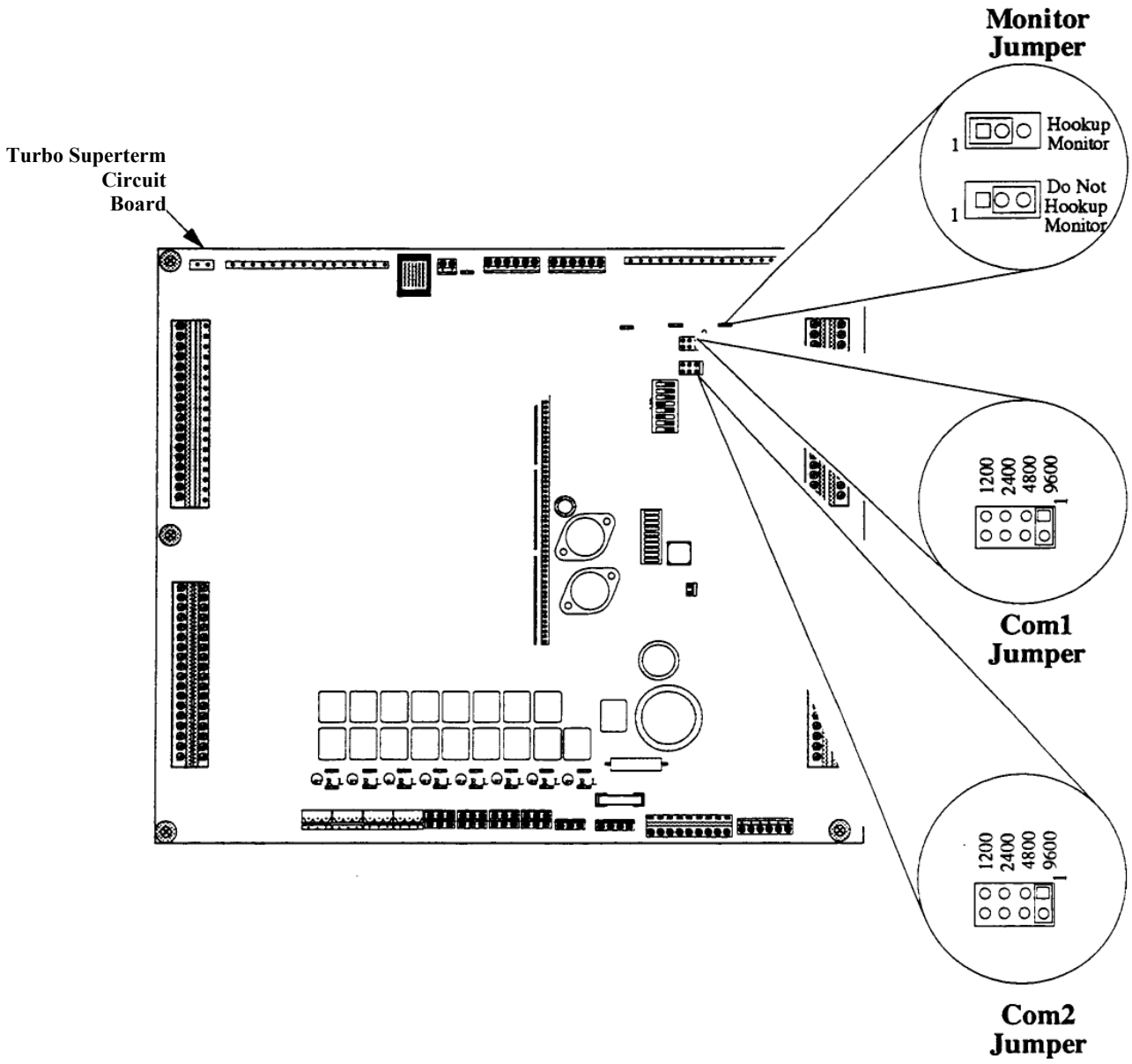


Figure 47 - COM1, COM2, and MONITOR Jumper Locations and Settings

MBAT Jumper

A lithium battery preserves data stored in memory for 6 months in the event of a power failure or loss of the system battery-backup (see Figure 48).

NOTES: The Turbo Superterm is shipped with the MBAT jumper in the OUT mode to prevent unnecessary battery drain.

DO NOT confuse the lithium battery with the back-up battery (see page 11). The lithium battery does not operate the Turbo Superterm in the event of a power failure.

***IN* - Data Saved**

The IN mode activates the lithium battery and preserves Turbo Superterm data in the event of a power failure or loss of the system battery-backup.

- Set the jumper to contact the center post (pin 2) and the left hand post (pin 1).

***OUT* - Data Lost**

The OUT mode de-activates the lithium battery. No Turbo Superterm programming or database information will be saved.

- Set the jumper to contact the center post (pin 2) and the right-hand post (pin 3).

MODE1 Jumper

The MODE 1 jumper is used to designate the particular Turbo Superterm as an active REPEATER or a passive MULTIDROP network member (see Figure 48).

***MULTIDROP* Mode**

Use this mode when the Turbo Superterm RS-422 Polling port is operating in a MULTIDROP network.

- Set the jumper to contact the center post (pin 2) and the right-hand post (see pin 3).

***REPEATER* Mode**

Use this mode when the Turbo Superterm RS-422 Polling port is operating in a REPEATER network.

- Set the jumper to contact the center post (pin 2) and the left-hand post (pin 1).

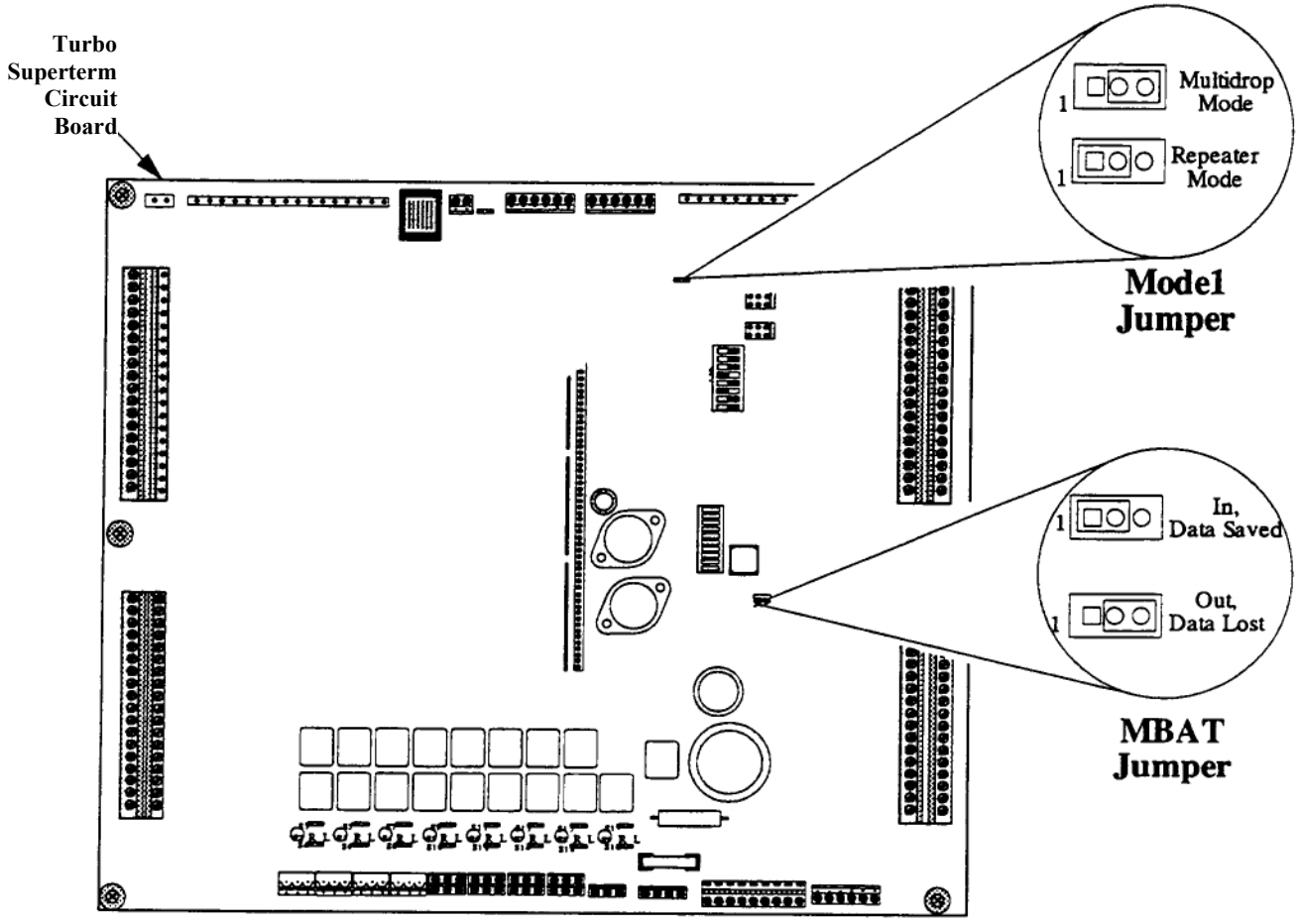


Figure 48 - Jumper Locations and Settings

Door Strike Jumper Setting

Door strike power may be either LOCAL or REMOTE (see page 28).

Each of the Turbo Superterm's door strike relays requires setting two associated jumpers.

The jumpers, labeled S3 through S18, are located on the Turbo Superterm circuit board below the bank of relays and between the relay fuses (see Figure 49).

NOTE: Use insulated needle-nose pliers when working with jumpers.

Table 50 relates the door strike relays to the appropriate jumper numbers.

Table 50 - Door Strike Relays and Associated Jumpers

Door Strike Relay #	Jumper Pair
1	S3 and S4
3	S5 and S6
5	S7 and S8
7	S9 and S10
9	S11 and S12
11	S13 and S14
13	S15 and S16
15	S17 and S18

LOCAL Power Jumper Setting

Operating specific relays on LOCAL power requires setting two associated jumpers to the LOCAL position.

- Verify that both jumpers for the associated relay (see Table 50) contact the center post, pin 2, and the right-hand post, pin 3 (see Figure 49, Detail A).

NOTE: The letters R and L on the jumper refer to REMOTE and LOCAL. *They DO NOT refer to Right and Left.*

REMOTE Power Jumper Setting

Operating specific relays on REMOTE power requires setting two associated jumpers to the REMOTE position.

- Verify that both jumpers for the associated relay (see Table 50) contact the center post, pin 2, and the left-hand post, pin 1 (see Figure 49, Detail B).

NOTE: The letters R and L on the jumper refer to REMOTE and LOCAL. *They DO NOT refer to Right and Left.*

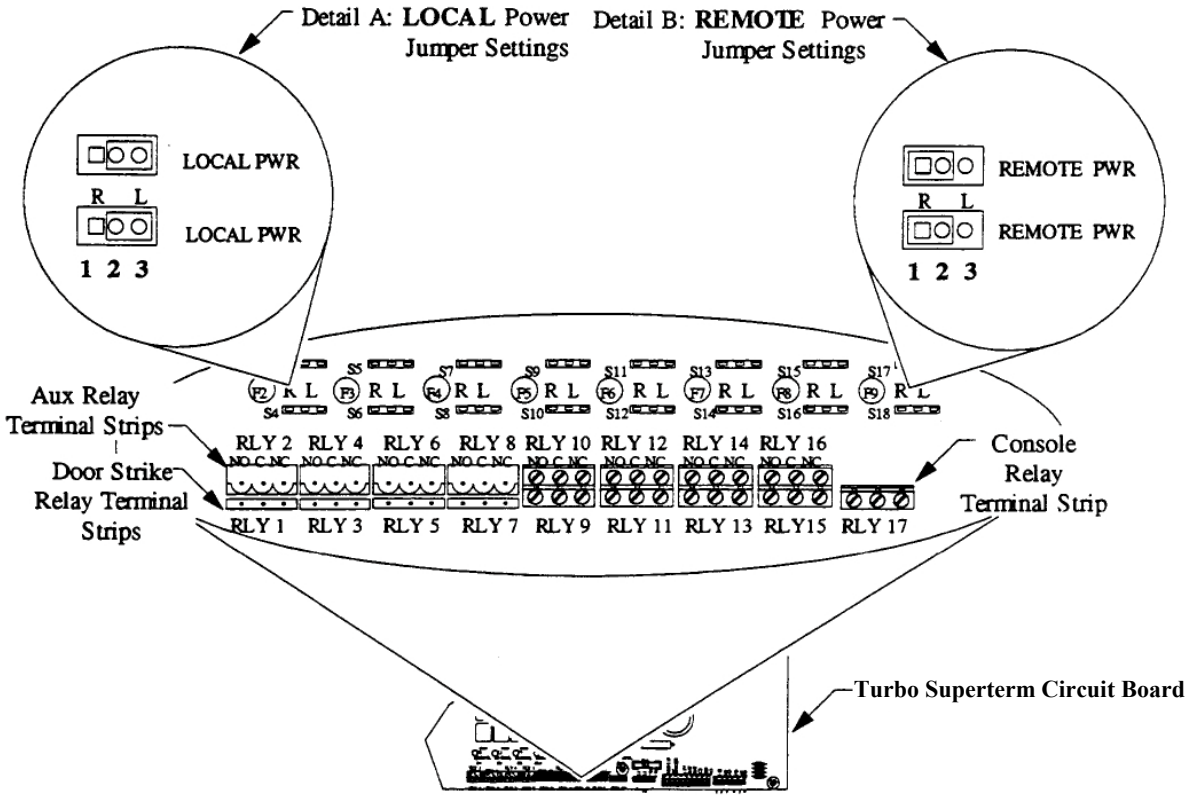

Detail A: LOCAL Power Jumper Settings
Detail B: REMOTE Power Jumper Settings
LOCAL PWR
R L
LOCAL PWR
1 2 3
REMOTE PWR
R L
REMOTE PWR
1 2 3
Aux Relay Terminal Strips
Door Strike Relay Terminal Strips
RLY 2 RLY 4 RLY 6 RLY 8 RLY 10 RLY 12 RLY 14 RLY 16
RLY 1 RLY 3 RLY 5 RLY 7 RLY 9 RLY 11 RLY 13 RLY15 RLY 17
Console Relay Terminal Strip
Turbo Superterm Circuit Board

Figure 49 - Turbo Superterm Door Strike Jumper Settings

LED Diagnostics

The Turbo Superterm circuit board uses LEDs to indicate the presence of required voltages and polling signals. Figure 50 shows the LED position on the Turbo Superterm circuit board and the individual LED functions.

Table 51 - LED Diagnostic Functions

LED Number	LED Indication	Notes
1	AC	AC voltage is present at the AC Power Input Terminal Block pins 7, 8, and 9
2	+12VDC	+12VDC voltage is present on the Turbo Superterm Circuit Board for distribution to the DR1 through DR8 terminal strips and at the AUX Power Terminal Strip
3	+5VDC	+5VDC voltage is present on the Turbo Superterm Circuit Board for distribution to the DR1 through DR8 terminal strips
4	RXD	Presence of an incoming polling signal from other panels or host computer (Panel Communication)
5	TXD	Presence of an outgoing polling signal from the Turbo Superterm board to a host computer (Panel Communication)
6	Blank	No function
7	Blank	No function
8	T2	Reserved for test function
9	Blank	No function
10	T1	Indicates CPU is operating ("Heartbeat")

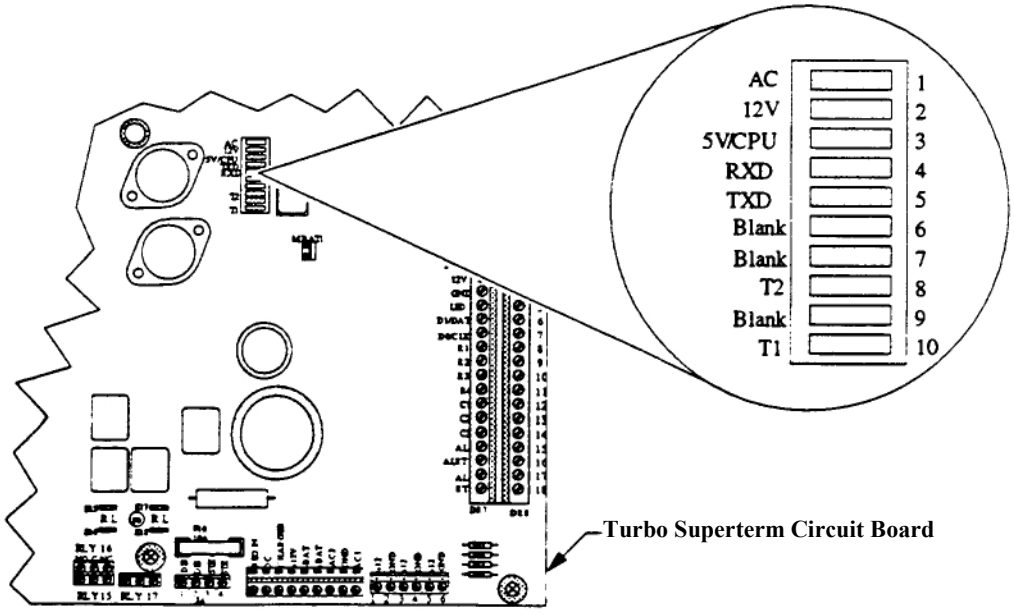


Figure 50 - Turbo Superterm Status LED's

Turbo Superterm Circuit Board Main Fuse

A 10-ampere (10A) slow-blow fuse protects the strike power circuit from faults and over current. The fuse is located on the lower right-hand edge of the circuit board above the STKPWR terminal strip (see Figure 51).

WARNING
Verify that the main AC power to the Turbo Superterm cabinet is switched OFF and locked against accidental starting.

1. Turn OFF the main circuit breaker controlling power to the Turbo Superterm cabinet.
2. Using a non-conducting fuse puller, remove the old fuse (see Figure 51).
3. Replace the fuse with a 5mm x 20mm long, 10-Amp, 250V, slow-blow fuse.
4. Reset the the main circuit breaker.

Turbo Superterm Door Strike Fuses

Eight 2-ampere (2A) slow-blow fuses protect the door strike circuits. These fuses are located in line across the lower center surface of the Turbo Superterm circuit board (see Figure 52).

WARNING
Verify that the main AC power to the Turbo Superterm cabinet is switched OFF and locked against accidental starting.

1. Turn OFF the main circuit breaker controlling power to the Turbo Superterm cabinet.
2. Locate the faulty door strike fuse (F2 - F9) (see Figure 52).
3. Using a non-conducting fuse puller, remove the old fuse.
4. Replace the fuse with a 2-Amp, SB, 250V, plug-in, slow-blow fuse.
5. Reset the the main circuit breaker.

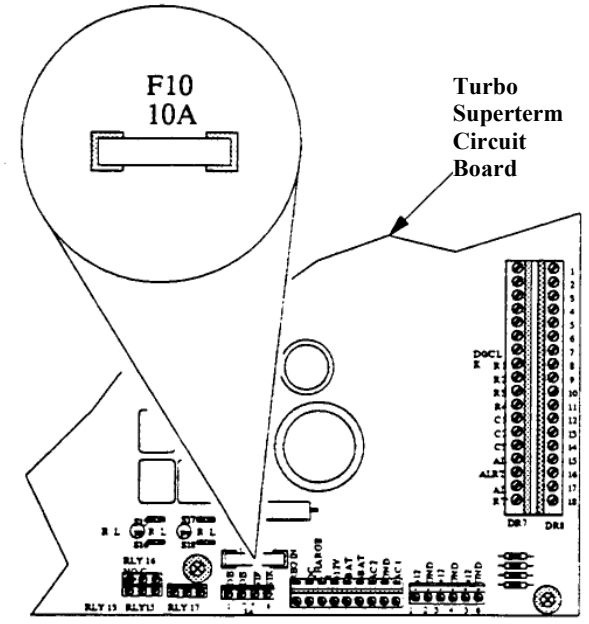


Figure 51 - Turbo Superterm Main Fuse Location

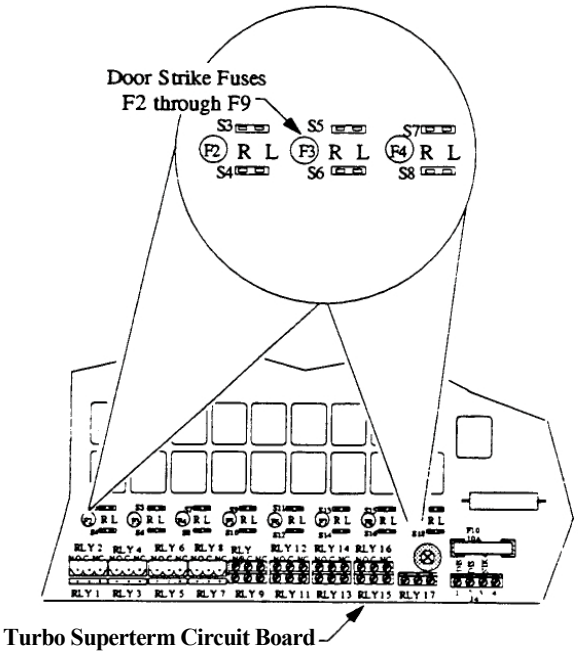


Figure 52 - Door Strike Fuse Location

UPGRADING

Expanded Memory Upgrade

The Turbo Superterm card holder capacity may be expanded by installing optional memory boards. The expanded memory may be factory installed or upgraded in the field. Memory upgrade options include two 2X2 MB memory boards (refer to Expansion Boards and Accessories section, page 11).

2X2 MB Expansion Board Upgrade Procedure

Allows the Turbo Superterm controllers to meet the requirements of managing large cardholder populations. THIS INSTALLATION procedure IS INTENDED FOR QUALIFIED SERVICE PERSONNEL ONLY. CAUTION: A second 2X2 MB memory board may be installed only on the Turbo Superterm family main circuit boards. If installing two memory boards (2MB each, 4 MB total) on the Turbo Superterm family of boards, the memory device located in U61 must be removed before installing the second 2X2 MB memory board.

1. Remove MBAT jumper and place on pins 2 and 3 (OUT). See page 77 (Figure 48).

2. Remove power from the Turbo Superterm. Inside the housing, remove the power connector from the bottom of the panel. (see Figure 53). Ensure that all power LED's are off.

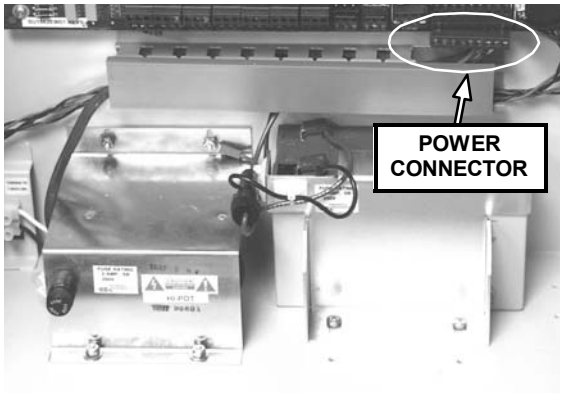


Figure 53 - Remove Power

3. Install polarizing plastic pin into socket (see Figure 54 below). The plastic pin is placed in the 2nd socket hole (from the top) to ensure that the 2X2 MB memory board pins are inserted correctly.
4. Insert 2X2 MB memory board into the right vertical socket in the Controller PCB (see Figure 54). Insert the top pin of the 2X2 MB memory board into the top socket hole (the missing pin in the 2X2 MB memory board should be at the top).

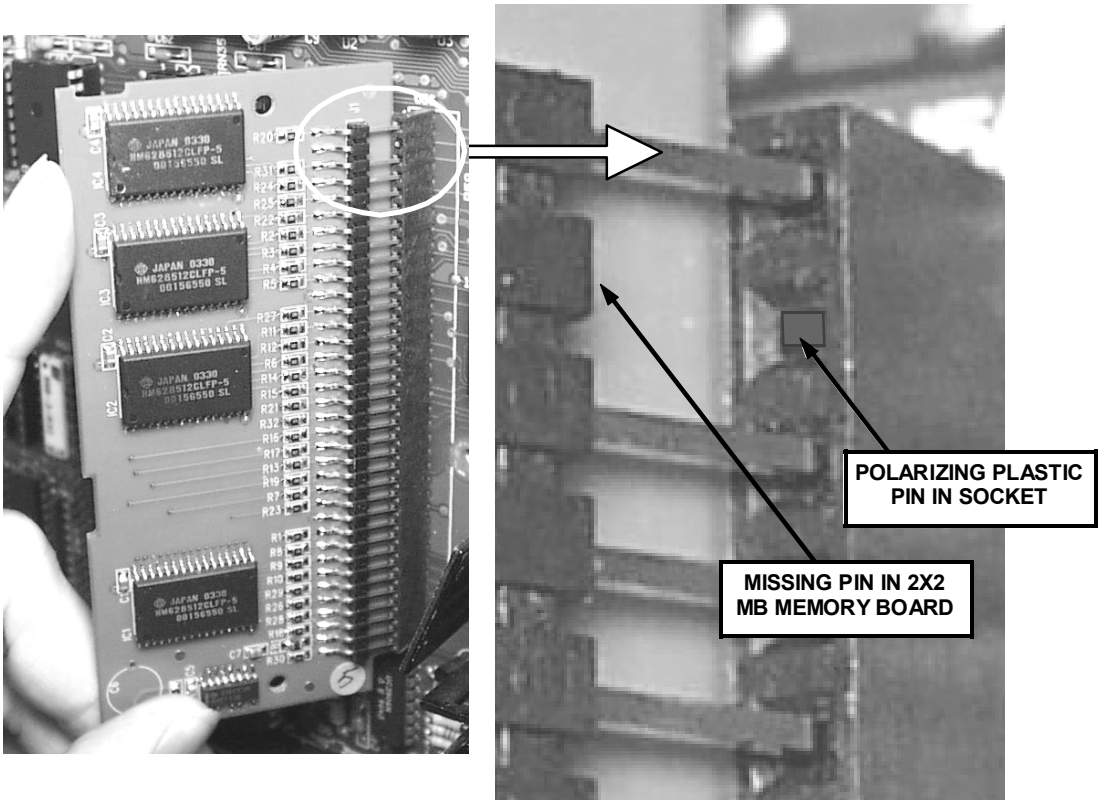


Figure 54: Insert 2X2 MB memory board. Be sure top pin is inserted into the top socket. Note the location of missing pin in the 2X2 MB memory board and the location of the polarizing plastic pin in the socket.

5. If installing a second memory card in the left vertical memory socket of the Turbo Superterm boards, you MUST first remove the memory device (chip or module) from location U61 (see Figure 55 and 55a, below). Always use the proper tool to remove the device, such as a DIP removal tool.

   Insert the second memory board into the left vertical socket in the Turbo Superterm PCB's (see Figure 54d on previous page). As with the first memory card in step 3, insert the top pin of the 2X2 MB memory board into the top socket hole (the missing pin in the memory board at the top).

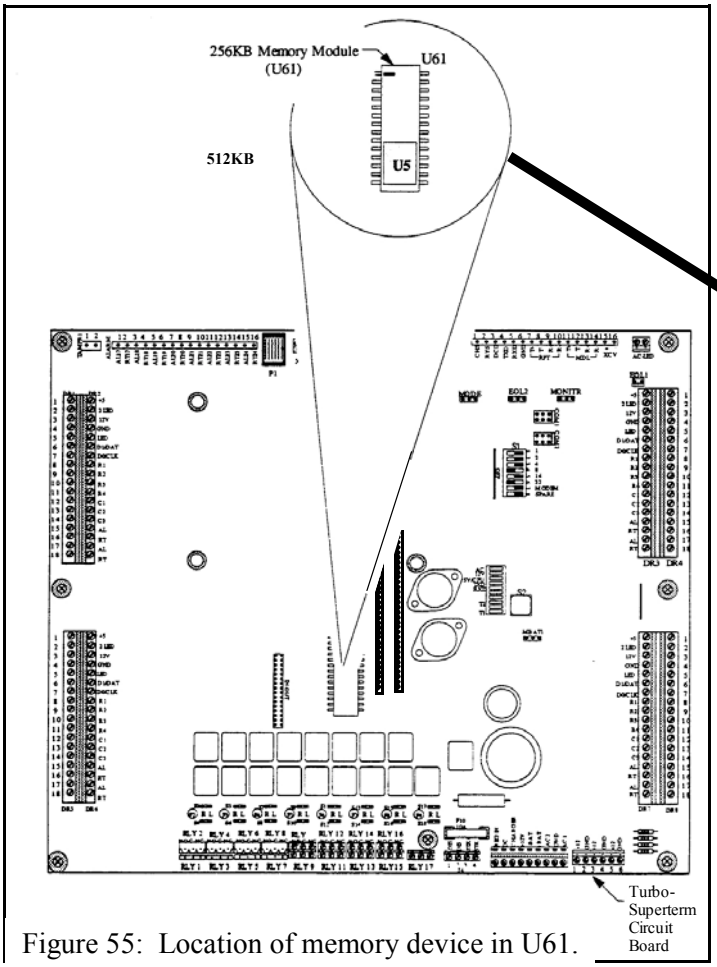


Figure 55: Location of memory device in U61.

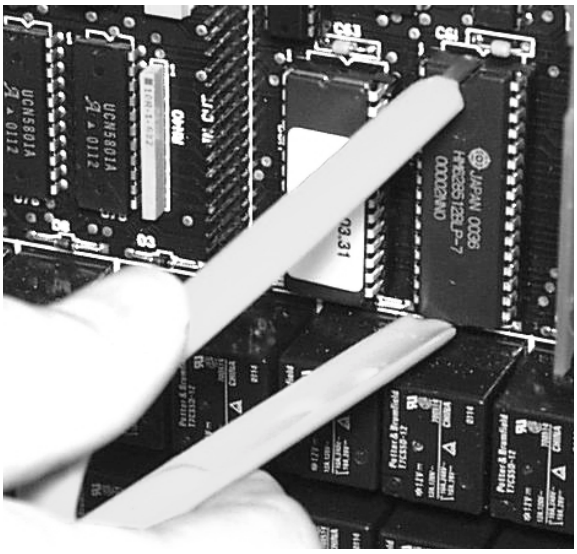


Figure 55a: Using a DIP removal tool as shown, remove memory device from location U61 (only if 2nd memory card is installed). See diagram at left for location of this memory device on the TurboSuperterm Circuit boards.

6. Install bracket. The Z-shaped memory board bracket is designed to add physical stability to the 2X2 MB memory boards. Secure the Z-shaped bracket to the controller PCB with the Phillips-head screw (inserted into the hole vacated by the 3/4" nylon standoff base in step 2). Helpful Hint: Use the Phillips screwdriver to hold the screw in the bracket hole (see figure 55b). While screw is held in place, insert screw into controller PCB hole and secure (see figure 55c). The notches in the Z-shaped bracket align with the "bracket notches" in the memory cards. If bracket is difficult to secure, be sure the pins in the memory board are installed correctly (see steps 2-3).

DO NOT FORCE BRACKET OR DAMAGE TO THE PCB AND MEMORY CARD CAN RESULT (see figure 55d).

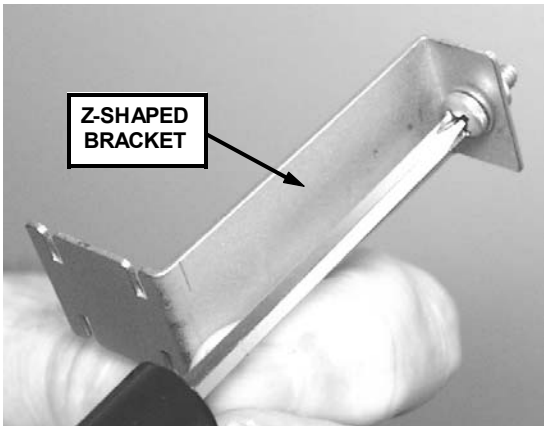


Figure 55b: Helpful Hint. Hold screw in place with screwdriver before inserting screw.

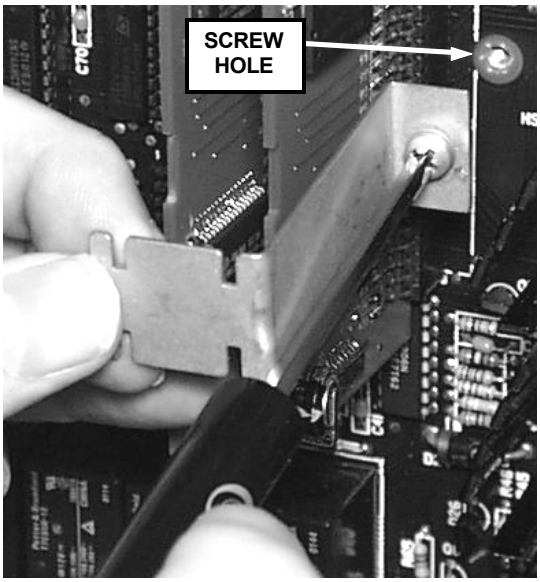


Figure 55c: While holding screw in place with screwdriver, insert screw into controller PCB hole and secure.

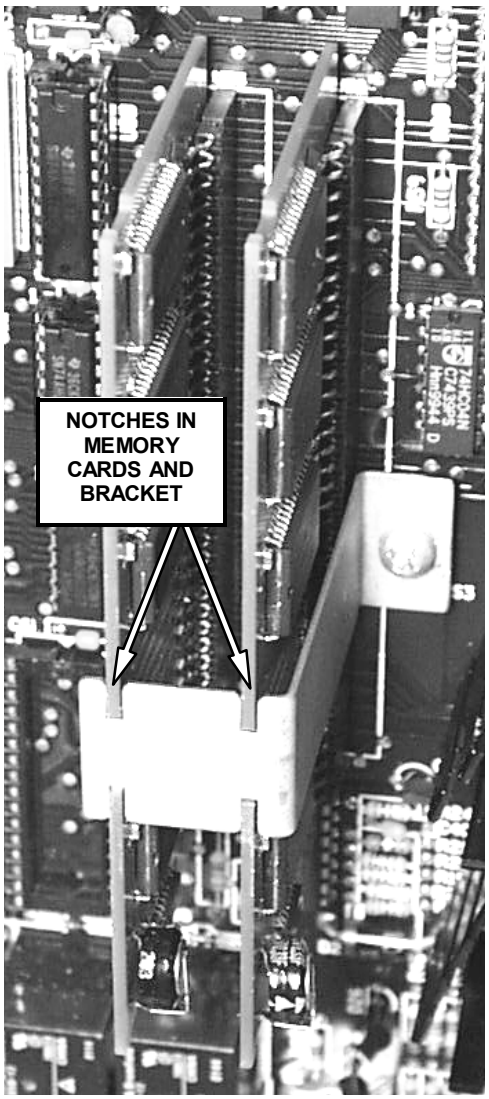


Figure 55d: Finished installation. The notches in the bracket align with the notches in the memory cards, holding the memory cards in place.

7. Restore power. Reconnect power connector at bottom of board. Replace MBAT jumper on pins 1 and 2 (IN), See page 77 (Figure 48). The "Heart beat" lamp should blink (at a rate of once every second) at location T1 on the LED display.

If there is a problem:
If the "Heartbeat" lamp on the PCB does not activate, then the firmware probably did not recognize the 4 MB configuration, therefore, be sure to upgrade the firmware to version 1.04.XX or later by installing an EEPROM memory chip into socket U39 with markings "Version 1.04.XX" (or later) and re-test system.

MAINTENANCE

Expansion Power Supply Replacement

The following procedure applies after determining that the Turbo Superterm on-board Linear Power Supply needs replacing.

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with power supply replacement.

1. Open the Turbo Superterm cabinet and locate the 12VDC power supply (P/N CICPEXPPWS) in the lower right corner of the cabinet (see Figure 56).
2. Disconnect the 2-pin Molex connector from the transformer module's power supply wires (one black and one white).
3. Disconnect the RED wire of the 12VDC output wiring harness from the power input terminal strip pin 4 (refer to page 18, Step-Down Transformer Connection for specific information).
4. Disconnect the BLACK wire of the 12VDC output wiring harness from the power input terminal strip pin 5 (refer to page 18, Step-Down Transformer Connection, for specific information).
5. Remove the two #6-32 nuts securing the power supply bracket to the Turbo Superterm cabinet.
6. Remove the power supply bracket from the Turbo Superterm cabinet.
7. Remove the two #6-32 nuts securing the power supply chassis to the rear wall of the Turbo Superterm cabinet.
8. Remove the two #6-32 x 1/4" Phillips head screws securing the power supply chassis to the bottom of the Turbo Superterm cabinet.
9. Remove the power supply chassis from the Turbo Superterm cabinet.
10. Install the new power supply in the reverse order of the removal.

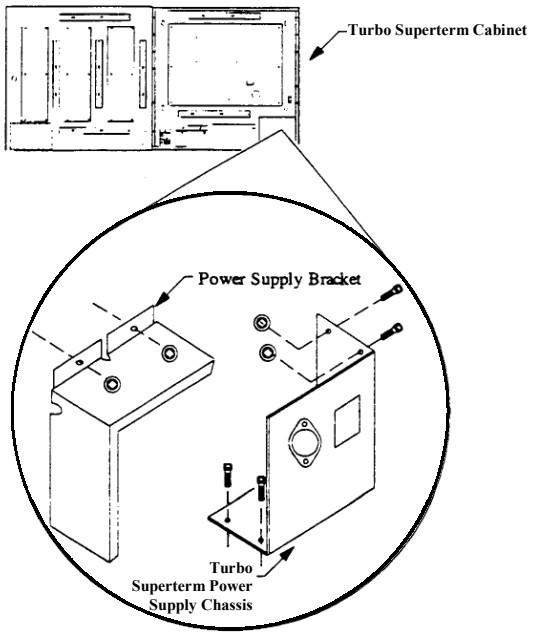


Figure 56 - Turbo Superterm Power Supply Replacement

Backup Battery Replacement

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with backup battery replacement.

1. Open the Turbo Superterm cabinet and locate the backup battery (P/N CI-HE0042 & CI-HE0047) secured to the lower center ledge of the cabinet (see Figure 57).
2. Remove the two #6-32 x 1/4" screws securing the backup battery to the Turbo Superterm cabinet.
3. Disconnect the RED lead from pin 6 (labeled +BAT) of the power input terminal strip (refer to page 18, StepDown Transformer Connection for specific information).
4. Disconnect the BLACK lead from pin 5 (labeled -BAT) of the power input terminal strip.
5. Disconnect the RED lead from the POSITIVE terminal of the battery.
6. Disconnect the BLACK lead from the NEGATIVE terminal of the battery.
7. Remove the old battery.
8. Install the new battery in the reverse order of the removal. **Note:** The PowerSonic PS-1270 or PS-12120 are accepted replacements.

Backup Battery In-Line Fuse Replacement

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with in-line fuse replacement.

1. Open the Turbo Superterm cabinet and locate the backup battery secured to the lower center ledge of the Turbo Superterm cabinet (see Figure 57).
2. Remove the old fuse from the fuse holder and replace with a new 3AG, 3A fuse.
3. Close the Turbo Superterm cabinet and restore the AC source voltage.

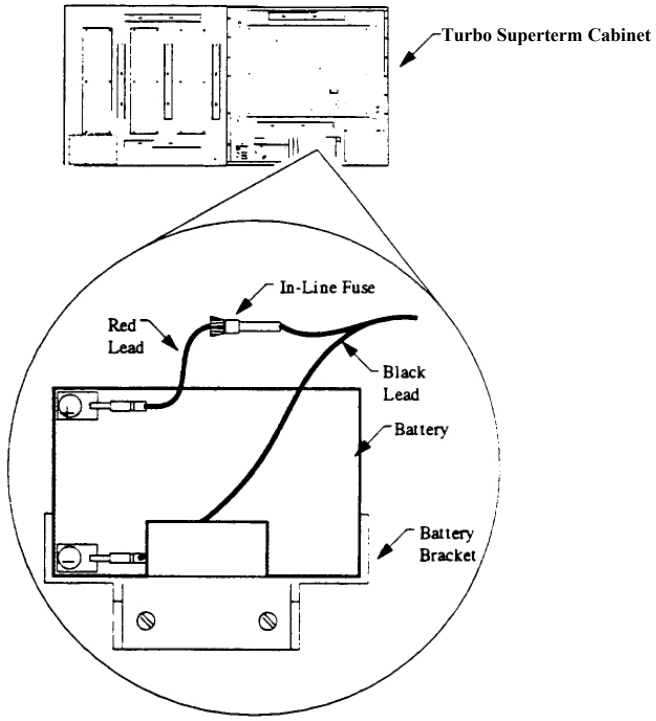


Figure 57 - Turbo Superterm Battery/In-Line Fuse Location

Turbo Superterm Step-Down Transformer Replacement

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with power supply replacement.

1. Open the Turbo Superterm cabinet and locate the transformer assembly (P/N CI-0300-1172-01) secured to the lower left-hand ledge of the Turbo Superterm cabinet (see Figure 58).
2. Disconnect the BLACK lead from pin 7 (labeled AC2) of the power input terminal strip (refer to page 18, Step-Down Transformer Connection for specific information).
3. Disconnect the YELLOW lead from pin 8 (labeled GND) of the power input terminal strip.
4. Disconnect the WHITE lead from pin 9 (labeled AC1) of the power input terminal strip.
5. Disconnect the 2-wire Molex connector between the transformer and the expansion power supply.
6. Disconnect the transformer's NEUTRAL (White) lead from the AC input power terminal block (refer to page 16, 120VAC Power for specific information).
7. Disconnect the transformer's LINE (Black) lead from the AC input power terminal block.
8. Remove the four (4) lock nuts securing the transformer assembly to the Turbo Superterm cabinet.
9. Remove the old transformer assembly.
10. Install the new transformer assembly in the reverse order of the removal.

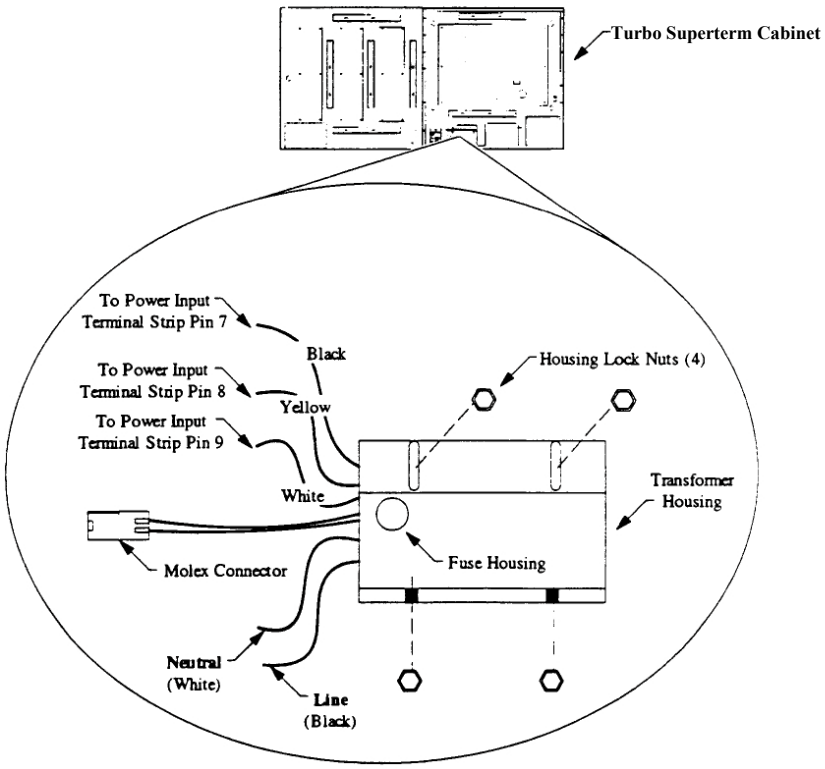


Figure 58 - Replacing the Turbo Superterm Transformer Assembly

Service Entrance Fuse Replacement

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with service entrance fuse replacement.

1. Open the Turbo Superterm cabinet and locate the transformer assembly secured to the lower left-hand ledge of the Turbo Superterm cabinet (see Figure 59).
2. Locate the fuse housing in the upper left-hand comer of the transformer assembly.
3. Remove the old fuse.
4. Replace with a new 3AG, 2A/120VAC fuse. (220VAC outside the United States: Replacement fuse is 5x20mm 1A time lag fuse).
5. Close the Turbo Superterm cabinet.
6. Restore the AC source voltage to the Turbo Superterm.

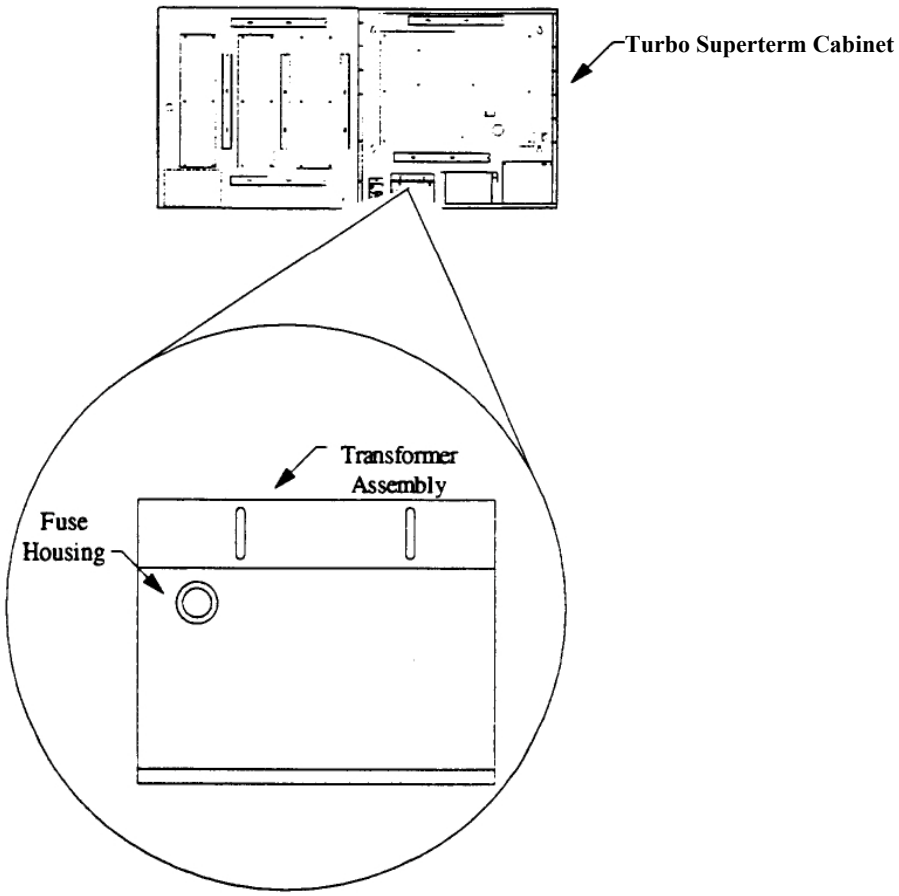


Figure 59 - Service Entrance Fuse Replacement

SPECIFICATIONS

SPECIFICATION	Quantity (8/4-Door)	Comments
Readers	8/4	Full function on or off line
Anti-Passback		Standard
Access Modes	4	Card Only, Unique Code only, Card and Code, Free Access
Serial Ports	3	Host computer, Aux. (RS-232)
Polling Modes	4	Dial-up (RS-232), RS-422 Multidrop and Repeat (RS485)
Baud Rates	7	1200, 2400, 4800, 9600, 19.2kbps, 38.4kbps, 57.6 kbps
Keypads	8/4	4 x 3
Relays	17/9	Form "C", contact rating of 2A @28VDC (Fused). Expandable
Alarms	24/16	Supervised or non-supervised (host programmable)
LEDs	16/8	2 LEDs per door
Tamper Switch	1	Pre-assigned
Reader Types		Wiegand/Proximity, Magnetic Stripe
Supply Voltage		120/220 VAC
Current Draw		1.0A @ 120VAC (Maximum)
Primary Battery Backup (Memory Only)		6 Months nominal at 25°C
Battery Backup		Approx. 4-6 hours
Weight		48 lbs.
Enclosure Dimensions		21.5"H x 21.25"W x 7"D
Temperature Range Operating Storage		 32-115°F (0-46°C) 32-149°F (0-65°C)
Relative Humidity		0% to 80% non-condensing
Card Capacity	20,000	Standard, expandable to 200,000
Time Zones	128	Standard
Access Levels	255	Standard
Holidays	50	Standard
Link Programs	64	Standard
Facility Codes	10	Standard
Transaction Buffer	1000	Standard, expandable to 250,000

Cables	AWG	Type *	Maximum Length
Alarm Inputs	22 ga	Stranded, shielded, w/drain 2-conductor alarm	500 ft (153m)
Readers: Magnetic Stripe & Wiegand/Proximity	22 ga	Stranded, shielded, w/drain 4 or 5-conductor (5-conductor for readers w/ LEDs)	500 ft 500 ft w/unbuffered Wiegand (153m unbuffered)
Readers: Magnetic Stripe	22 ga	Stranded, shielded, w/drain 4 or 5-conductor (5-conductor for readers w/ LEDs)	500 ft (153m)
Keypad	22 ga	Stranded, shielded w/drain 7-conductor	500 ft (153m)
Polling Line RS-422 (Network)	22 ga	Stranded, shielded, w/drain 2-twisted pair	4000 ft (1220m)
RS-232, Dial-Up (Host Computer)	22 ga	Stranded, shielded, w/drain	50 ft (15m)
Aux. 232 Port	22 ga	Stranded, shielded, w/drain 3-conductor	50 ft (15m)

*** NOTE:** DO NOT use twisted pair cables except for RS-422 and RS-485 connections.

POWER RATINGS

As supplied from the factory, the Turbo Superterm contains a 115VAC Power Supply, or an optional 220VAC Power Supply.

Continental Instruments LLC recommends using a dedicated, unswitched power outlet to prevent any interference from other equipment that might be connected on the same line.

Voltage	Current (Maximum)	Power (Maximum)
AC- 105-125VAC	1.0 Amperes	125VA
210-250VAC	0.5 Amperes	
DC- 12VDC	0.5 Amperes	6 Watts